IPC Series

BOX-PC 955S Series
Fanless, Atom N2600
CFast, DC input

User's Manual

CONTEC CO.,LTD.

Check Your Package

Thank you for purchasing the CONTEC product.
The product consists of the items listed below.
Check, with the following list, that your package is complete. If you discover damaged or missing items, contact your retailer. If you use driver&utility software set, download it from the CONTEC's Web site.

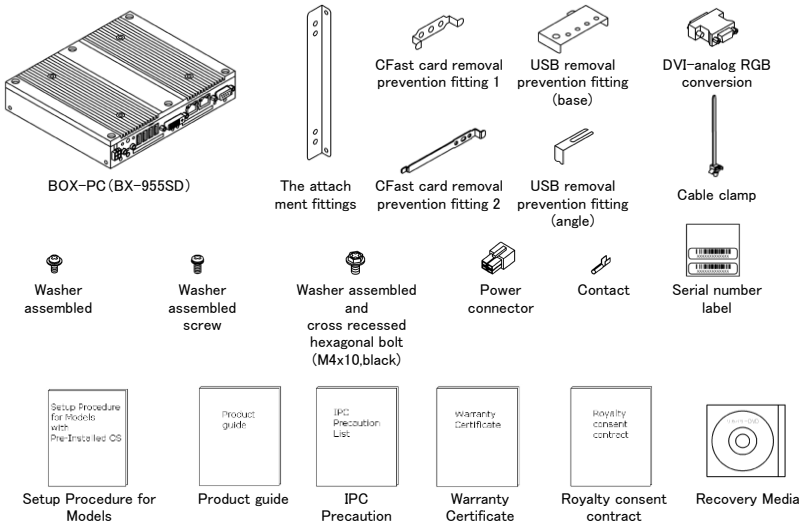
Product Configuration List

	[without OS] BX-955SD-DC6000	[with OS] BX-955S-DC6311 BX-955SD-DC6311 BX-955SD-DC6312 BX-955SD-DC631N
Name	Pcs.	Pcs.
BOX-PC	1	1
The attachment fittings	2	2
CFast card removal prevention fitting 1	1	1
CFast card removal prevention fitting 2	1	1*1
USB removal prevention fitting (base)	1	1
USB removal prevention fitting (angle)	4	4
Washer assembled screw (M3 x 6)	4	4
Washer assembled screw (M3 x 8, black)	6	6
Washer assembled and cross recessed hexagonal bolt (M4 x 10, black)	4	4
Power supply connector complete set		
Power connector	1	1
Contact	4	4
Cable clamp	2	2
DVI-analog RGB conversion adapter	1	1
Product guide	1	1
IPC Precaution List	1	1
Warranty Certificate	1	1
Serial number label	1	1
Royalty consent contract	—	1
Setup Procedure for Models with Pre-Installed OS	—	1
Recovery Media *2	—	1

*1 It is attached to the main body.

*2 Please confirm latest information on the CONTEC homepage.

Product Configuration Image



* See the Product Configuration List to check if all the components are included for the specified number of units.

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Table of Contents

Check your package i

Copyright ii

Trademarks ii

Table of Contents iii

1. INTRODUCTION 1

About the Product 1
- Features 1
- Supported OS 3

Customer Support 4
- Web Site 4

Limited One-Year Warranty 4

How to Obtain Service 4

Liability 4

Safety Precautions 5
- Safety Information 5
- Caution on the BX-955Sx Series 5

2. SYSTEM REFERENCE 9

Specification 9

Power Management Features 11

Power Requirements 12
- Power Consumption 12

Physical Dimensions 13

3. HARDWARE SETUP 15

Before Using the Product for the First Time 15

Hardware Setup 16
- Attaching the CFast Attachment Fittings 16
- Attaching the Attachment Fittings 16
- Attaching the FG 17
- Fastening the Cable 18
- Installation of VESA metal fittings 19
- Installation Requirements 21

4. EACH COMPONENT FUNCTION 25

Component Name 25
- Front View 25

Side View 25
System Configuration 26
Component Function 27
LED: POWER, ACCESS, STATUS 27
DC Power Input Connector : DC-IN 27
POWER SW 28
Line out Interface: LINE OUT 28
MIC in Interface: MIC 28
Giga bit-Ethernet: LAN A – B 29
USB Ports 30
Serial Port Interface : SERIAL A - B 31
DVI Interface : DVI 32
CFast Card Connector (Primary IDE Connection) : CFast1 34

5. BIOS SETUP 35

Introduction 35
Starting Setup 35
Using Setup 36
Getting Help 36
In Case of Problems 36
A Final Note About Setup 36
Main Menu 37
Setup Items 37
Main 38
Advanced 39
PCI Subsystem Settings 41
ACPI Settings 42
CPU Configuration 43
IDE Configuration 44
USB Configuration 45
Super I/O Configuration 46
Serial Port A Configuration 47
Serial Port B Configuration 48
Hardware Monitor 49
PPM Configuration 50
Chipset 51
Host Bridge 52
Memory Frequency and Timing 53
Intel IGD Configuration 54
South Bridge 55
TPT Devices 57
Boot 59
Security 60

Save & Exit 62
POST Beep 64
Position and Settings of the ROM Clear Switches 65

6. APPENDIX 67

Memory Map 67
I/O Port Addresses 68
Interrupt Level List 69
POST Codes 70
SERIAL I/O Address and Register Function 72
Watch-Dog-Timer 78
Status LED 82
Battery 84
Difference Between BX-955 and BX-955S 84

7. LIST OF OPTIONS 85

1. Introduction

About the Product

This product is a small PC for embedded use that is equipped with an Intel(R) Atom N2600 1.6 GHz, low-power, dual core processor.
This product has a fanless and slitless case, uses CFast for storage, and has a completely spindleless design.
This product is equipped with various expansion interfaces such as 1000BASE-T, USB 2.0, and serial.
This product is the successor to the BX955 and has achieved high calculation capabilities such as an improved CPU processing capability that is twice that of its predecessor. In addition, this product assists our customers in their implementations of plans to reduce running costs and energy usage. Thanks to its installation compatibility, this product can be swapped into existing systems.
Its rich variety of expansion interfaces, such as 1000BASE-T, USB 2.0, and serial, and its usage of CFast cards for storage enable this product to be designed in a completely spindleless manner.

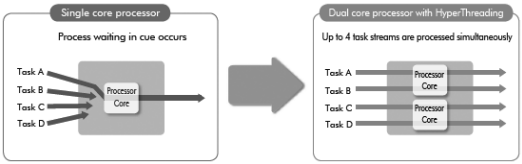
This product is available in the following 5 models :

- Base model with Intel(R) Atom Processor N2600 1.6GHz
  BX-955SD-DC6000 (Memory 2GB, without OS, CFast card)
- Windows Embedded Standard 2009 model, VGA type with Intel(R) Atom Processor N2600 1.6GHz
  BX-955S-DC6311 (Memory 2GB, with OS, 4GB, CFast card)
- Windows Embedded Standard 2009 model, DVI type with Intel(R) Atom Processor N2600 1.6GHz
  BX-955SD-DC6311 (Memory 2GB, with OS, 4GB, CFast card)
- Windows Embedded Standard 7 model with Intel(R) Atom Processor N2600 1.6GHz
  BX-955SD-DC6312 (Memory 2GB, with OS, 8GB, CFast card)
- Windows Embedded Standard 7 model with Intel(R) Atom Processor N2600 1.6GHz
  BX-955SD-DC631N (Memory 2GB, with OS, 8GB, CFast card)

Features

- Dual core energy saving processor with HyperThreading Technology

This product uses a dual core, four-thread Intel(R) Atom N2600 1.6 GHz processor. This enables the product to perform stable concurrent processing at the same time of multiple applications such as communication, control, and HMI applications.
Compared to the conventional BX955, this product boasts CPU performance that is twice that of its predecessor, which enables this product to be applied to uses that require higher levels of calculation processing.



- Contributes to Reductions in Running Cost and Energy Usage

Although this product guarantees sufficient performance, it sports low power consumption. The slitless and fanless design leads to a reduction in maintenance and inspection work. What's more, as a resource-saving PC, this product assists our customers in their implementations of plans to reduce running costs and energy usage.

- Serving the downsizing of equipment, a small footprint design for A5-sized installation area

This product adopts space-saving design of 182(W) x 155(D) x 35(H), permitting placement in the smaller, A5-sized space with opening of only 50mm. It largely serves downsizing of your equipment, fits any area with the aestheticness kept. It is also possible to attach to the VESA standard 75 x 75, 100 x 100mm using the optional fittings.

- Remote power management function to reduce operation tasks

This product supports timed/automated system start-up (Resume By Alarm). For example, it enables unattended operation, such as starting to show information of an establishment in unison at opening time. Also, it supports system start-up externally via network (Wake On LAN) and modem (Power On by Ring). It encourages significant labor saving in operation.

- Major types of peripherals are supported with rich interfaces including two CFast card slots

It has a variety of extended interface such as 1000BASE-T x 2, USB2.0 x 4, serial (RS-232C) x 2.
It has two CFast card slots that can use for OS and data. They are very useful because you can use one slot for system start-up and the other for maintenance, system log, or taking away the collected data.

- Falling-off prevention tools and fixing clamps provided to avoid trouble caused by disconnected cable

This product stays trouble-free, being equipped with USB removal prevention fitting and cable clamp for connectors with no locking mechanism, such as USB cable, and with hardware to properly mount and avoid falling out of CFast card.

- Safety design required for embedded applications

For Windows Embedded Standard installed model, it is possible to use the EWF*1 function of OS. It is designed for safety required for embedding purpose, for example, prohibiting unwanted writing to the CFast card with EWF function will relieve the concern about the writing limits to the CFast card and prevent an unintentional system alteration.

*1 EWF (Enhanced Write Filter) is a function specific to Windows Embedded Standard that protects the disk from being actually written by redirecting the writing to RAM.

- A wide range of power supplies (10.8 - 31.2VDC) supported

As the product supports a wide range of power (10.8 - 31.2VDC), it can be used in a variety of power environments. The separately available AC adapter adds support for 100VAC power.

Supported OS

- Windows® Embedded Standard 2009 32bit Japanese
- Windows® Embedded Standard 7 32bit Japanese / Multi-Language

Customer Support

CONTEC provides the following support services for you to use CONTEC products more efficiently and comfortably.

Web Site

Japanese	http://www.contec.co.jp/
English	http://www.contec.com/
Chinese	http://www.contec.com.cn/

Latest product information

CONTEC provides up-to-date information on products.
CONTEC also provides product manuals and various technical documents in the PDF.

Free download

You can download updated driver software and differential files as well as sample programs available in several languages.

Note! For product information

Contact your retailer if you have any technical question about a CONTEC product or need its price, delivery time, or estimate information.

Limited One-Year Warranty

CONTEC products are warranted by CONTEC CO., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original products. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization number (RMA) from the CONTEC group office where you purchased before returning any product.

* No product will be accepted by CONTEC group without the RMA number.

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Safety Precautions

Understand the following definitions and precautions to use the product safely.

Safety Information

This document provides safety information using the following symbols to prevent accidents resulting in injury or death and the destruction of equipment and resources. Understand the meanings of these labels to operate the equipment safely.

⚠ DANGER	DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
⚠ WARNING	WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
⚠ CAUTION	CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.

Caution on the BX-955Sx Series

Handling Precautions

⚠ WARNING

- Always check that the power supply is turned off before connecting or disconnecting power cables.
- Do not modify the product.
- Always turn off the power before inserting or removing circuit boards or cables.
- This product is not intended for use in aerospace, space, nuclear power, medical equipment, or other applications that require a very high level of reliability. Do not use the product in such applications.
- If using this product in applications where safety is critical such as in railways, automotive, or disaster prevention or security systems, please contact your retailer.
- Do not attempt to replace the battery as inappropriate battery replacement poses a risk of explosion.
- For battery replacement, contact your retailer as it must be performed as a process of repair.
- When disposing of a used battery, follow the disposal procedures stipulated under the relevant laws and municipal ordinances.

⚠ CAUTION

- Do not use or store this product in a location exposed to high or low temperature that exceeds range of specification or susceptible to rapid temperature changes.
  Example: - Exposure to direct sun
  - In the vicinity of a heat source
- Do not use this product in extremely humid or dusty locations. It is extremely dangerous to use this product with its interior penetrated by water or any other fluid or conductive dust. If this product must be used in such an environment, install it on a dust-proof control panel, for example.
- Avoid using or storing this product in locations subject to shock or vibration that exceeds range of specification.
- Do not use this product in the vicinity of devices that generate strong magnetic force or noise. Such products will cause this product to malfunction.
- Do not use or store this product in the presence of chemicals.
- To clean this product, wipe it gently with a soft cloth dampened with either water or mild detergent. Do not use chemicals or a volatile solvent, such as benzene or thinner, to prevent pealing or discoloration of the paint.
- This product's case may become hot. To avoid being burned, do not touch that section while this product is in operation or immediately after turning off the power. Avoid installation in a location where people may come into contact with that section.
- CONTEC does not provide any guarantee for the integrity of data on CFast card.
- Always disconnect the power cable from the receptacle before mounting or removing the expansion board, or before connecting or disconnecting any connector.
- To prevent corruption of files, always shutdown the OS before turning off this product.
- CONTEC reserves the right to refuse to service a product modified by the user.
- In the event of failure or abnormality (foul smells or excessive heat generation), unplug the power cord immediately and contact your retailer.
- To connect with peripherals, use a grounded, shielded cable.
- The CFast card connector doesn't support hot plug. While this product is turned on, do not insert or remove the CFast card or touch the CFast card connector on the product. This product may malfunction or cause a failure.
- Component Life:
  (1) Battery---The internal calendar clock and CMOS RAM are backed by a Lithium primary battery. The backup time at a temperature of 25°C with the power disconnected is 10 years.
  (2) CFast---The CFast model uses a CFast in the OS storage area.
  The NandFlash can be rewritten 60,000 times or more.
  As a reference value, the rewritable lifetime can be determined by the following calculation.
  Rewritable lifetime (number of times) = ((capacity [MB] / management block size [MB]) × 60,000 times) / (number of management blocks rewritten each time)
  Example: If a 4 MB file is created and is rewritten once every 10 seconds
  Rewritable lifetime = ((3577/2) × 60000)) / 2 = 53,655,000 (number of times)
  Lifetime = 53,655,000 / ((60/10) × 60 × 24 × 365)≒17 (year)
  * Replacement of expendables is handled as a repair (there will be a charge).
  * Component life is not guaranteed value but only referential value.

FCC PART 15 Class A Notice

NOTE

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment.
This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference at his own expense.

WARNING TO USER

Change or modifications not expressly approved the manufacturer can void the user's authority to operate this equipment.

2. System Reference

Specification

Table 2.1. Functional Specification *< 1 / 2 >*

Model		BX-955Sx-DC6xxx
CPU		Intel(R) Atom™ Processor N2600 (1.6GHz)
Chip set		Intel(R) NM10
BIOS		BIOS (mfd. by AMI)
Memory		2GB (204pin SO-DIMM×1), PC3-8500 DDR3 SDRAM
Video	Controller	Intel(R) GMA3650 (with Intel(R) Atom™ Processor N2600)
	Video RAM	Main memory shared
	Video BIOS	64KB(C0000H-CFFFFH)
	Display I/F	DVI-I I/F x 1(29 pin connector x 1)
System resolution *1*2	DVI	640 x 480, 800 x 600, 1,024 x 768, 1,280 x 768, 1,280 x 1,024, 1,360 x 768, 1,400 x 1,050, 1,600 x 900, 1,600 x 1,200, 1,920 x 1,080, 1,920 x 1,200 (16,770,000 colors)
	Analog RGB	640 x 480, 800 x 600, 1,024 x 768, 1,280 x 768, 1,280 x 1,024, 1,360 x 768, 1,400 x 1,050, 1,600 x 900, 1,600 x 1,200, 1,920 x 1,080, 1,920 x 1,200 *3 (16,770,000 colors)
Audio		HD Audio compliant LINE OUT: ϕ3.5 Stereo mini jack Full-scale output level 1.2Vrms(Typ.), MIC IN: ϕ3.5 Stereo mini jack Full-scale input level 1.5Vrms(Typ.)
CFast card slot		2 slots, CFast CARD Type I , bootable BX-955SD-DC6000 : - BX-955S-DC6311, BX-955SD-DC6311 : CFast is finished mounting. (4GB) BX-955SD-DC6312 : CFast is finished mounting. (8GB)
Serial I/F		RS-232C (general-purpose) : 2ch(SERIAL PORT1,2) 9pin D-SUB connector (male) Baud rate : 50 - 115,200bps

*1 : It may not be possible for the screen to be displayed correctly depending on the specifications of the connected display.
Also, when an analog RGB display is connected and when the OS is Windows Embedded Standard 7 and a DVI display is connected, although all the resolutions shown in this table can be set for the resolution setting of the OS, use the product with a resolution that matches the specifications of the connected display.

*2 : On Windows Embedded Standard 2009, the primary display is fixed as shown below.
BX-955S-DC6311 : Analog RGB
BX-955SD-DC6311 : DVI

*3 : You cannot set the resolution to 1,920 × 1,200 when the OS is Windows Embedded Standard 7 and an analog RGB display is connected.

Table 2.1. Functional Specification *< 2 / 2 >*

Model		BX-955Sx-DC6xxx
LAN *4	I/F	1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector x 2(Wake On LAN support)
	Controller	LAN-A : Realtek 8111E Controller LAN-B : Realtek 8111E Controller
USB I/F		4channels (USB 2.0-compliant)
Keyboard/mouse I/F		None *5
General-purpose I/O		None
Hardware monitoring		Monitoring CPU temperature, board temperature, power voltage
Watch dog timer		Software programmable, 255 level (1sec - 255 sec) Causes a reset upon time-out.
RTC/CMOS		Lithium backup battery life : 10 years or more The real-time clock is accurate within ±3 minutes (at 25°C) per month
Power Management		Power management setup via BIOS Power On by Ring / Wake On LAN Supports ACPI Power management
Power supply	Rated input voltage	12 - 24VDC *6
	Range of input voltage	10.8 - 31.2VDC
	Power consumption	12V 2.5A (Max.), 24V 1.4A (Max.)
	External device power supply capacity	- CFast card slot : +3.3V 1A (500mA x 2) - USB I/F : +5V 2A (500mA x 4)
Physical dimensions (mm)		182(W) x 155(D) x 35(H) (No protrusions)
Weight		About 1.3kg

*4 : If you use the 1000BASE-T, be careful of the operating temperature.
For more details on this, refer to chapter3, Installation Requirements.

*5 : Use USB I/F for the keyboard / mouse.

*6 : Use a power cable shorter than 3m.

Table 2.2. Installation Environment Requirements

Model			BX-955Sx-DC6xxx
Ambient specifications	Operating temperature *1		0 - 50°C (When using 1000BASE-T : 0 - 45°C)
	Storage temperature		-10 - 60°C
	Humidity		10 - 90%RH (No condensation)
	Floating dust particles		Not to be excessive
	Corrosive gases		None
	Line-noise resistance	Line noise	AC line / ±2kV *2, Signal line / ±1kV (IEC61000-4-4 Level 3, EN61000-4-4 Level 3)
		Static electricity resistance	Contact discharge / ±4kV (IEC61000-4-2 Level 2, EN61000-4-2 Level 2) Atmospheric discharge / ±8kV (IEC61000-4-2 Level 3, EN61000-4-2 Level 3)
	Vibration resistance	Sweep resistance	10 - 57Hz/semi-amplitude 0.375 mm 57 - 500Hz/5.0G 60 min. each in x, y, and z directions (JIS C 60028-2-6-compliant, IEC 60068-2-6-compliant)
	Impact resistance		100G, half-sine shock for 6 ms in x, y, and z directions (JIS C 60068-2-27-compliant, IEC 60068-2-27-compliant)
	Grounding		Class D grounding (previous class 3 grounding), SG-FG / continuity

*1 : For more details on this, please refer to chapter 3, “Installation Requirements”.

*2 : When IPC-ACAP12-04A is used.

Power Management Features

- Support both ACPI (Advanced Configuration and Power Interface) and legacy (APM) power management.
- ACPI v4.0 compliant
- Support hardware automatic wake-up

Power Requirements

Your system requires a clean, steady power source for reliable performance of the high frequency CPU on the product, the quality of the power supply is even more important. For the best performance makes sure your power supply provides a range of 10.8 V minimum to 31.2 V maximum DC power source.

Power Consumption

For typical configurations, the CPU card is designed to operate with at least a 60W power supply. The power supply must meet the following requirements :

- Rise time for power supply: 2 ms - 30 ms

The following table lists the power supply's tolerances for DC voltages:

Table 2.3. DC voltage tolerance

DC Voltage	Acceptable Tolerance
+ 12V - 24V	+ 10.8V - 31.2V

Physical Dimensions

BX-955Sx-DC6xxx

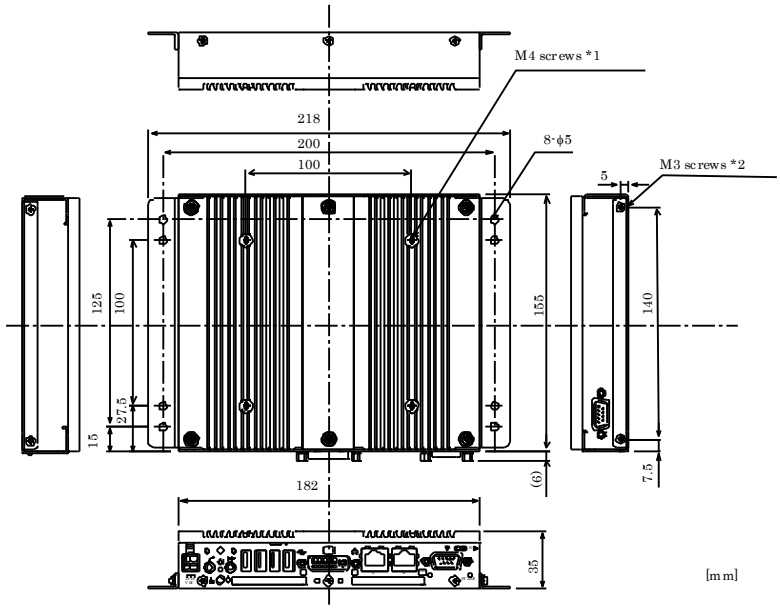
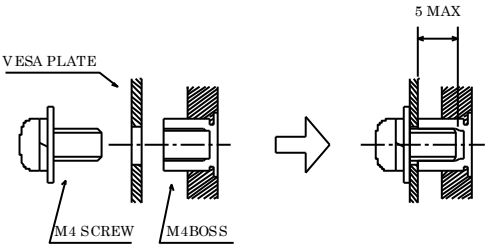


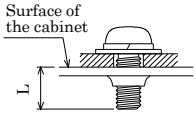
Figure 2.1. BX-955Sx-DC6xxx

⚠ CAUTION

*1 : The length (L) from the tip of M4 boss to the M4 screw tip should be 5mm or less. If not doing so, it may be exactly fixed.



*2 : When you fasten the bundled attachment fittings to be fixed to the body, you should use the attached screws (M3 x 8).Otherwise, the length (L) from the surface of the cabinet to the screw tip should be 6mm or less. If not doing so, it may be damaged.



3. Hardware Setup

Before Using the Product for the First Time

Follow the next steps to set up this product:

STEP1 By referring to the information in this chapter, install, connect and set this product.

STEP2 Connect cables.
Connect the cable of necessary external devices, such as keyboard and a display, to this product using appropriate cables.

STEP3 Turn on the power.
After verifying that you have correctly followed steps 1 and 2, turn on the power.
If you find any abnormality after turning on the power, turn it off and check to see if the setup has been performed properly.

STEP4 Set up BIOS.
By referring to Chapter 5, set up BIOS. This setup requires a keyboard and a display.

*1 Before using this product, be sure to execute "Restore Defaults" to initialize the BIOS settings to their default values.
(See Chapter 5, "Save & Exit".)

⚠ CAUTION

When you are using Windows Embedded Standard 2009, be sure to check that the BIOS setup has been performed, and then, on the BIOS menu, set "VBIOS Select for OS" to "Other."
Set "Boot Display Type" to "DVI" for the DVI type (BX-955SD-DC6311) and to "CRT" for the VGA type (BX-955S-DC6311). When you execute the Restore Defaults command of the BIOS, "VBIOS Select for OS" is set to "Win 7" and "Boot Display Type" is set to "CRT + DVI."
See Chapter 5, "Intel IGD Configuration".

⚠ CAUTION

Be sure to connect the keyboard and mouse to it before turning the power on for the first time.

Hardware Setup

- Before you start, be sure that the power is turned off.
- Remove only those screws that are explained. Do not move any other screw.

Attaching the CFast Attachment Fittings

(1) After inserting a CFast Card, fasten the bundled CFast attachment fittings with a screw.

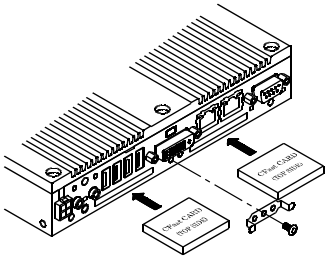


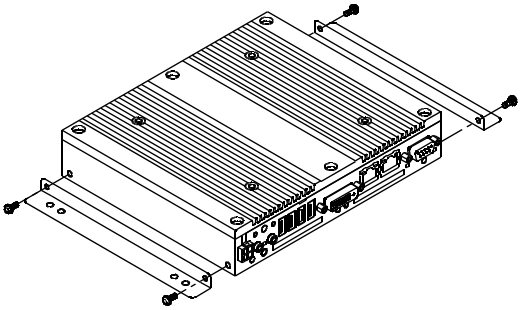
Figure 3.1. Attaching the CFast Attachment Fittings

⚠ CAUTION

- Insert the CFast Card face up.
- Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 3 - 3.5kgf·cm.

Attaching the Attachment Fittings

(1) Use screws to attach the bundled attachment fittings with a screw.
Do not tighten screws with excess force.



* Attached screw (M3 x 8)

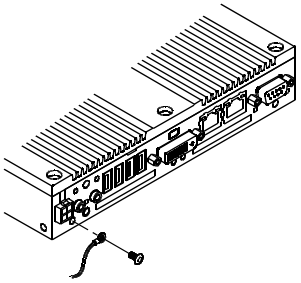
Figure 3.2. Attaching the Attachment Fittings

⚠ CAUTION

Screw holes may be damaged if screws are tightened with a torque greater than the specified torque. The specified tightening torque is 5 - 6kgf ·cm.

Attaching the FG

(1) Use screws to attach the FG.



* Attached screw (M3 x 8)

Figure 3.3. Attaching the FG

⚠ CAUTION

The FG pin of this product is connected to the GND signal of the DC power connector (DC-IN). Note that the connection cannot be cut off.

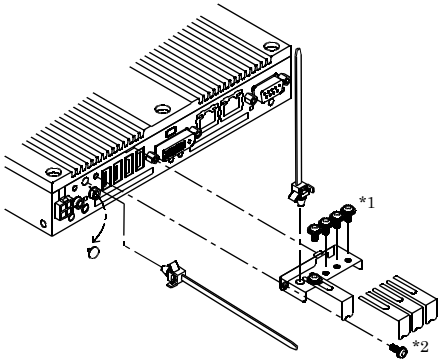
Screw holes may be damaged if screws are tightened with a torque greater than the specified torque.The specified tightening torque is 5 - 6kgf·cm.

Fastening the Cable

This product comes with clamps for fixing cables.

Fastening the LINEOUT, USB Cable

(1) The system unit has a hole for attaching cable clamp to USB removal prevention fitting. Using a cable clamp for a cable with lock-less connector, such as the LINEOUT and USB Cable, prevents the connector from being unplugged. Use the cable ties and cable clamps appropriately according to the connecting states and wiring directions of cables.



*1 Attached screw (M3 x 6)

*2 Attached screw (M3 x 8)

Figure 3.4. Attaching the cable clamp

(2) The photo below shows an example of using a cable clamp. Fix the cable with a clamp without applying stress to the connector.

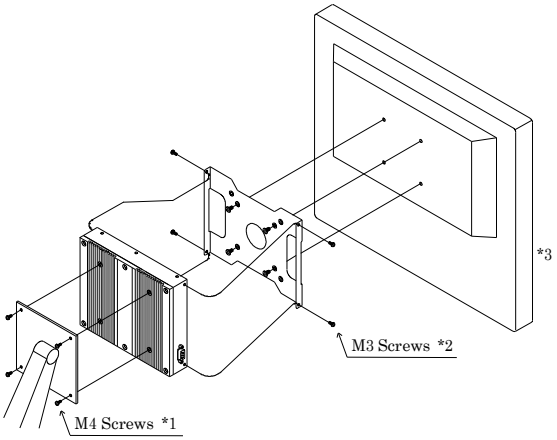
Figure 3.5. Using example of cable clamp

Installation of VESA metal fittings

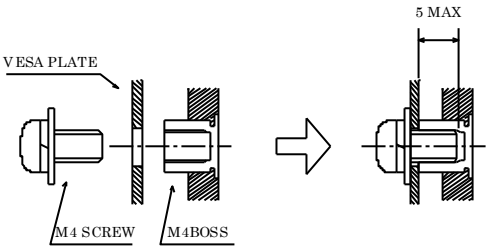
This product complies with the VESA standard. For information on VESA attachment and on VESA attachment metal fittings, see the following information.

You can fix this product to VESA holes with a pitch of 75 x 75 or 100 x 100 by using the following VESA attachment metal fittings.

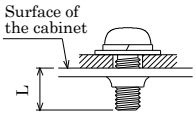
The VESA attachment metal fittings are optional products.
For more details on this, see Chapter 7.



*1 : The length (L) from the tip of M4 boss to the M4 screw tip should be 5mm or less.If not doing so,it may be exactly fixed.



*2 : When you fasten the bundled attachment fittings to be fixed to the body, you should use the attached screws (M3 x 8).Otherwise, the length (L) from the surface of the cabinet to the screw tip should be 6mm or less.If not doing so, it may be damaged



*3 : The liquid crystal display is possible and weight that can be the installation it is 8 kg or less possible.

Figure 3.6. Installation of VESA metal fittings

⚠ CAUTION

- If you tighten the screws with a tightening torque greater than that specified, the screw holes may be damaged.
  The appropriate tightening torque for the screws of the upper surface heat sink and side installation metal fittings is 5 to 6 kgf•cm.
  When using the VESA attachment metal fittings, the vibration resistance and impact resistance are the values shown below.
  (*When a CONTEC FPD-H75XT-DC1 [weight: 5.6 kg, pitch: 75 mm] is attached)

  10 - 57Hz/semi-amplitude 0.075 mm, 57 - 150Hz/1.0G 40 min. each in x, y, and z directions
  (JIS C0040-compliant, IEC 68-2-6-compliant)
  10G, half-sine shock for 11 ms in x, y, and z directions
  (JIS C0041-compliant, IEC 68-2-7-compliant)
- When the product is attached to the VESA attachment metal fittings, check the vibration resistance and impact resistance of the display and the tightening torque of the screws before using the product.

Installation Requirements

Be sure that the operating temperature is within the range specified in the installation environment requirement by making space between the product and device that generates heat or exhaust air.

BX-955Sx-DC6xxx

Installable directions at operating temperature 0 - +50°C (When using 1000BASE-T : 0 - +45°C)

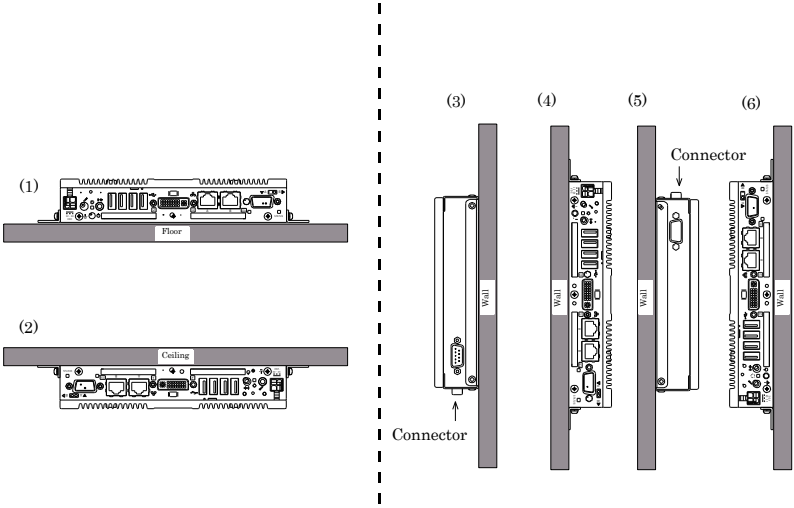


Figure 3.7. Installation Orientation (BX-955SD-DC6xxx)

⚠ CAUTION

Note that even though the ambient temperature is within the specified range, an operational malfunction may occur if there is other device generating high heat; the radiation will influence the product to increase its temperature.

Distances between this product and its vicinity

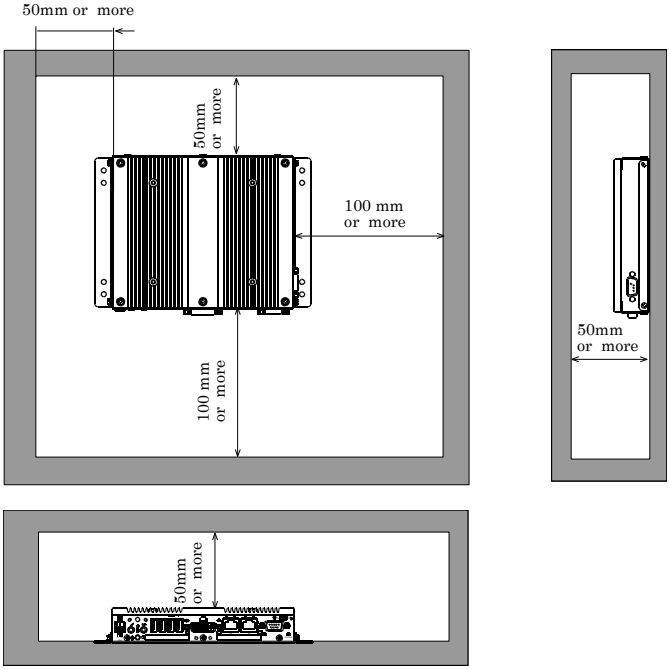


Figure 3.8. Distances between this product and its vicinity

⚠ CAUTION

Do not install this product into the fully-sealed space except the case in which the internal temperature is adjustable by equipment such as air conditioner. Troubles such as operational malfunctions could be occurred by the temperature increase caused by long-term usage.

Operating temperature

In this product, the operating temperature is decided from the multiple measurement points as shown below. When making use of the product, the air current should be adjusted to prevent that all the temperatures measured at the measurement points exceed the specified temperature.

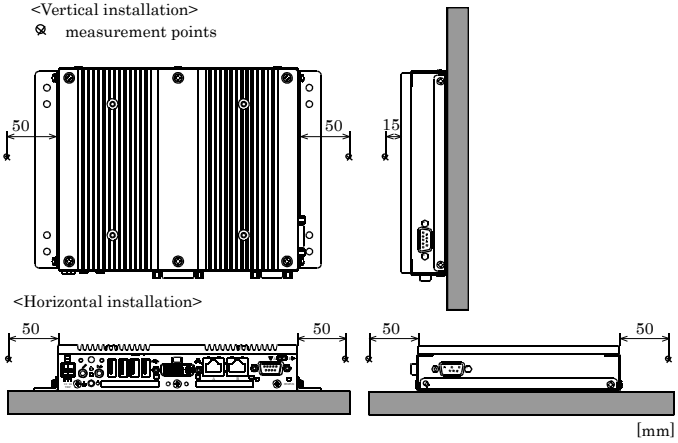


Figure 3.9. Operating temperature

4. Each Component Function

Component Name

Front View

BX-955Sx-DC6xxx

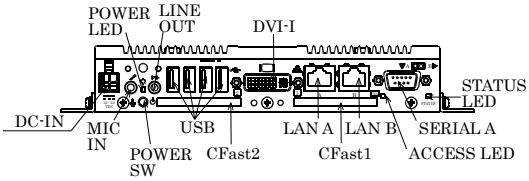


Figure 4.1. Component Name ***< 1 / 2 >***

Side View

BX-955Sx-DC6xxx

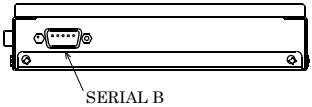


Figure 4.1. Component Name ***< 2 / 2 >***

Table 4.1. Component Function

Name	Function
POWER-SW	Power switch
POWER LED	Power ON display LED
ACCESS LED	CFast disk access display LED
STATUS LED	Status LED
DC-IN	DC power input connector
LINE OUT	Line out (ϕ3.5 PHONE JACK)
MIC IN	Mike in (ϕ3.5 PHONE JACK)
LAN A	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
LAN B	Ethernet 1000BASE-T/100BASE-TX/10BASE-T RJ-45 connector
USB	USB port connector x 4
SERIALA	Serial port A connector (9pin D-SUB/male)
SERIALB	Serial port B connector (9pin D-SUB/male)
DVI-I	Display (29pin D-SUB/female)
CFast1	CFast card slot
CFast2	CFast card slot 2

System Configuration

BX-955Sx-DC6xxx

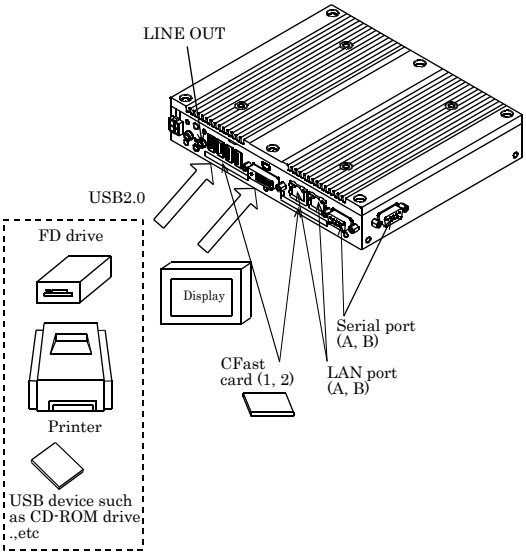


Figure 4.2. System Configuration

Component Function

LED: POWER, ACCESS, STATUS

There are 3 LED in front of this product.

Table 4.2. Display Contents of LED

LED name	State	Display contents
POWER LED	OFF	Indicates that this product is switched off.
	ON (Green)	Indicates that this product is switched on.
ACCESS LED	ON (Orange)	Indicates that the CFast device is being accessed.
STATUS LED	OFF	You can control the behavior of LED from the user application. *1
	Flashing, ON (Red)	You can control the behavior of LED from the user application. *1

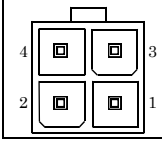
*1 See Chapter 6, "Appendix".

DC Power Input Connector : DC-IN

To supply the power, always use the power supply listed below.

Rated input voltage : 12 - 24VDC
Range of input voltage : 10.8 - 31.2VDC
Power capacity : 12V 2.5A or more, 24V 1.4A or more

Table 4.3. DC Power Connector

Connector type	9360-04P (mfd. by ALEX)			
	Pin No.	Signal name	Pin No.	Signal name
	4	12 - 24V	3	12 - 24V
	2	GND	1	GND

Applicable connector on the connector side

Housing : 9357-04 (mfd. by ALEX) or 5557-04R (mfd. by MOLEX)
Contact : 4256T2-LF (AWG18-24) (mfd. by ALEX) or 5556 (AWG18-24) (mfd. by MOLEX)

Rise time of power supply

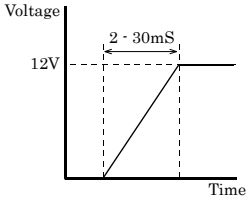


Figure 4.3. Graph of Rise Time of Power Supply

POWER SW

POWER SW is provided.

Line out Interface: LINE OUT

A line output connector is provided. You can plug a headphone or amplifier-integrated speakers into this connector.

MIC in Interface: MIC

A MIC input connector is provided. You can plug a microphone to this connector for sound input.

Audio driver

The audio driver is required to use the microphone input and line output interfaces.

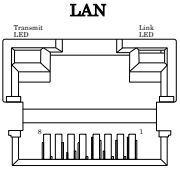
Install the appropriate audio driver for your OS from the CONTEC's Web site.

Giga bit-Ethernet: LAN A – B

This product is equipped with 2 ports for giga bit.

- Network type : 1000BASE-T/100BASE-TX/10BASE-T
- Transmission speed : 1000M/100M/10M bps
- Max. network path length : 100m/segment
- Controller : Realtek 8111E (LAN-A/B)

Table 4.4. Giga bit-Ethernet Connector



Pin No.	Function	
	100BASE-TX	1000BASE-T
1	TX+	TRD+(0)
2	TX-	TRD-(0)
3	RX+	TRD+(1)
4	N.C.	TRD+(2)
5	N.C.	TRD-(2)
6	RX-	TRD-(1)
7	N.C.	TRD+(3)
8	N.C.	TRD-(3)

LEDs for display of network statuses:

Right LED : Link LED
Normal connection : Green ON, Operation: Green Blinking
Left LED : Operation LED
10M : Off, 100M : Green, 1000M : Orange

LAN drivers

Install the appropriate audio driver for your OS from the CONTEC's Web site.

⚠ CAUTION

When using any OS other than pre-installed one, LAN-1 and LAN-2 may not be assigned to silk print "LAN-A" and "LAN-B" respectively.

USB Ports

This product is equipped with 4 channels for USB 2.0 interface.

Table 4.5. USB Connector

	Pin No.	Function
	1	USB_VCC
	2	USB-
	3	USB+
	4	USB_GND

Serial Port Interface : SERIAL A - B

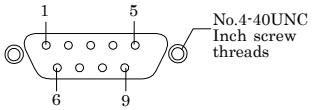
SERIAL A,B

The product has 2 channels of serial ports supporting up to a baud rate of 115,200bps with a 16-byte transmission-dedicated data buffer and a 16-byte reception-dedicated data buffer. You can use “Chapter 5 BIOS Setup” to configure an I/O address, interrupt and unused state for each of the ports independently. (The same I/O address and IRQ cannot be shared with any other device.)
Please refer to “Chapter 6 I/O Port Addresses” for more information on I/O address and register function.

Table 4.6. SERIAL A, B I/O Addresses and Interrupts

SERIAL	I/O address	Interrupt
A	3F8h - 3FFh	IRQ 4
B	2F8h - 2FFh	IRQ 3

Table 4.7. Serial Port A, B Connector

Connector used on the product	9-pin D-SUB (MALE)		
			
Pin No.	Signal name	Meaning	Direction
1	CD	Carrier detect	Input
2	RD	Received data	Input
3	TD	Transmitted data	Output
4	DTR	Data terminal ready	Output
5	GND	Signal ground	-----
6	DSR	Data set ready	Input
7	RTS	Request to send	Output
8	CTS	Clear to send	Input
9	RI	Ring indicator	Input

DVI Interface : DVI

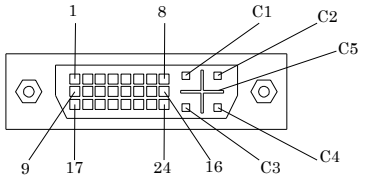
A DVI interface is provided. You can use it to connect a CRT (even a D-SUB 15 pin connector is acceptable by using the bundled DVI-analog RGB adapter) or a CONTEC Panel Link display. The connector is named DVI (DVI-I 29-pin connector).

⚠ CAUTION

For the Windows Embedded Standard 2009 DVI type (BX-955SD-DC6311), the BIOS SETUP screen is only displayed on the display that is connected to the DVI connector.

Table 4.8 DVI Connector

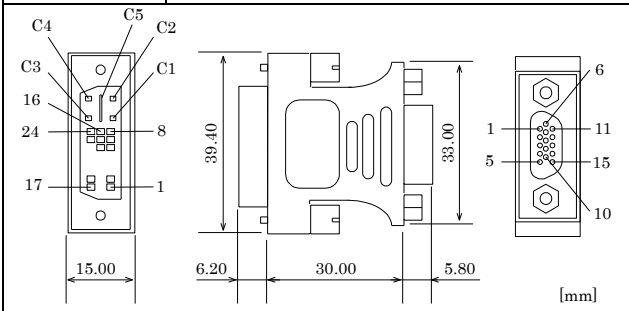
Connector type	DVI-I 29 pin



Pin No.	Signal name	Pin No.	Signal name	Pin No.	Signal name
1	DATA2-	13	N.C.	C1	RED
2	DATA2+	14	+5V	C2	GREEN
3	DATA2 SHIELD	15	GND	C3	BLUE
4	N.C.	16	HPD	C4	HSYNC
5	N.C.	17	DATA0-	C5	GND
6	DDC CLK	18	DATA0+		
7	DDC DATA	19	DATA0 SHIELD		
8	VSYNC	20	N.C.		
9	DATA1-	21	N.C.		
10	DATA1+	22	DATA0 SHIELD		
11	DATA1 SHIELD	23	CLK+		
12	N.C.	24	CLK-		

Table 4.9 DVI-analog RGB conversion adapter

Connector type	DVI-I 29 pin



Signal on analog RGB			
Pin No.	Pin No.	Pin No.	Pin No.
1	RED	9	+5V
2	GREEN	10	GND
3	BLUE	11	N.C.
4	N.C.	12	DDC DATA
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDC CLK
8	GND		

Display driver

Install the appropriate audio driver for your OS from the CONTEC's Web site

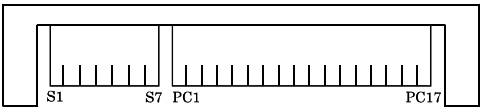
⚠ CAUTION

- For Windows Embedded Standard 2009, the primary display cannot be changed.
- If you connect to the RGB connector displays that process the unused pins in a special manner, the PC may not start.
- For the Windows Embedded Standard 2009 RGB model (BX-955S-DC6311), the BIOS SETUP screen is only displayed on the display that is connected to the RGB connector.
- For Windows Embedded Standard 2009, you need to set the screen resolution if the display cable is not connected to this DVI-D interface at OS startup, but connected after OS startup (hereinafter referred to as "Late Insertion").
- On Windows Embedded Standard 7, if you start the OS and then connect the display cable, the screen may not be displayed.
- For the Windows Embedded Standard 7 model (BX-955SD-DC6312), the BIOS SETUP screen may not be displayed when some RGB displays are connected. In this situation, connect a different RGB display, and then set "Boot Display Type" to "CRT" on the "Intel IGD Configuration" menu.

CFast Card Connector (Primary IDE Connection) : CFast1

The CFast Card (Type I) can be connected.
The CFast card connector doesn't support hot plug. Please neither pulling out opening of CFast in the state of power supply ON of this product nor come in contact with CFast. This product may malfunction or cause a failure.

Table 4.10. CFast Card Connector

Connector used on the product	CFast Connector		
			
Pin No.	Signal name	Pin No.	Signal name
S1	GND	PC1	CDI
S2	TX+	PC2	GND
S3	TX-	PC3	N.C.
S4	GND	PC4	N.C.
S5	RX-	PC5	N.C.
S6	RX+	PC6	N.C.
S7	GND	PC7	GND
		PC8	LED
		PC9	N.C.
		PC10	N.C.
		PC11	N.C.
		PC12	N.C.
		PC13	+3.3V
		PC14	+3.3V
		PC15	GND
		PC16	GND
		PC17	CDO

5. BIOS Setup

Introduction

This chapter discusses AMI's Setup program built into the FLASH ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in FLASH ROM so that it retains the Setup information when the power is turned off.

The rest of this chapter is intended to guide you through the process of configuring your system using Setup.

Starting Setup

The BIOS is immediately activated when you first power on the computer. The BIOS reads the system information contained in the FLASH ROM and begins the process of checking out the system and configuring it. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1 By pressing <Del> or <F2> immediately after switching the system on, or

2 By pressing the <Del> or <F2> key when the following message appears briefly at the bottom of the screen during the POST (Power On Self-Test).

Press <DEL> or <F2> to enter setup.

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

⚠ CAUTION

For the Windows Embedded Standard 7 model (BX-955SD-DC6312), the BIOS SETUP screen may not be displayed when some RGB displays are connected. In this situation, set "Boot Display Type" to "CRT" on the "Intel IGD Configuration" menu.

Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the "+" and "-" keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Table 5.1. Using Setup

Key	Function
Up Arrow	Move to the previous item
Down Arrow	Move to the next item
Left Arrow	Move to the item on the left (menu bar)
Right Arrow	Move to the item on the right (menu bar)
Esc	Main Menu: Quit without saving changes Submenus: Exit Current page to the next higher level menu
Move Enter	Move to the item you desired
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help on Setup navigation keys
F2 key	Load previous settings
F3 key	Load the optimized defaults
F4 key	Save all settings changes to the FLASH ROM and exit

Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the F1 key again.

In Case of Problems

If it is not possible to boot the computer after system settings have been changed and saved during setup, this product will need to be repaired.

The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your systems manufacturer to provide the absolute maximum performance and reliability. If chipset settings are changed even slightly, it may become necessary to repair the unit.

A Final Note About Setup

The information in this chapter is subject to change without notice.

Main Menu

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. By pressing the left or right arrow keys, you will be able to move the tab of each item.

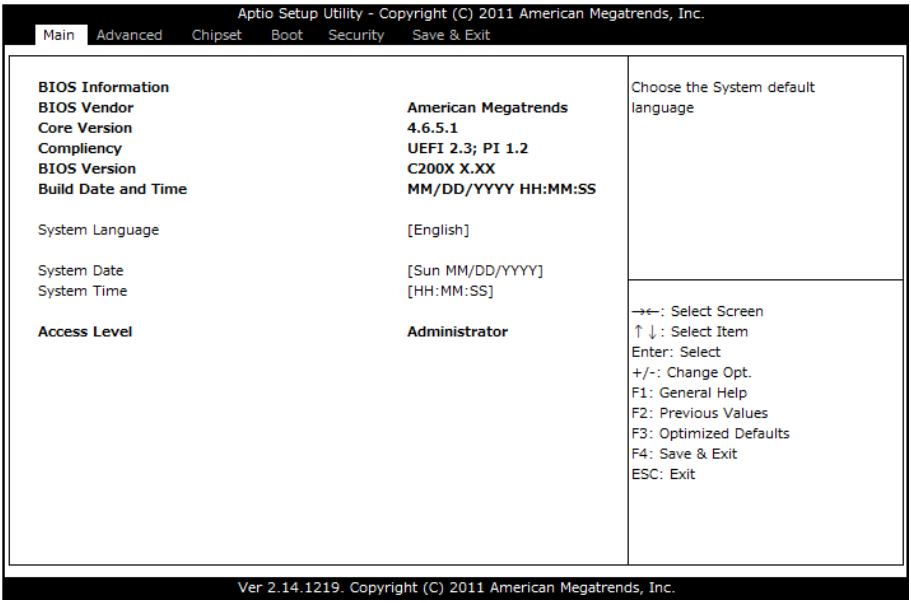


Figure 5.1. Main Manu

Setup Items

You can choose the following tabs.

Main

Use this menu to confirm the system basic configuration and set the language and time at the same time.

Advanced

Use this menu to set the detailed function that can setting to your system.

Chipset

Use this menu to specify the setting about your chipset.

Boot

Use this menu to specify the setting about the system boot.

Security

Use this menu to set the password so that the system security can be protected.

Save & Exit

Use this menu to load or save the setup item and to exit the setup menu.

Main

Use this menu to check basic system configuration. Settings that can be configured in the Main menu are described in the table below.

Table 5.2 Main Menu Selections

Item	Options	Description
System Date	Month / Day / Year	Set the system date. Note that the 'Day' automatically changes when you set the date.
System Time	Hour : Minute : Second	Set the system time.

Advanced

Use this menu to set the detailed function that can setting to your system.

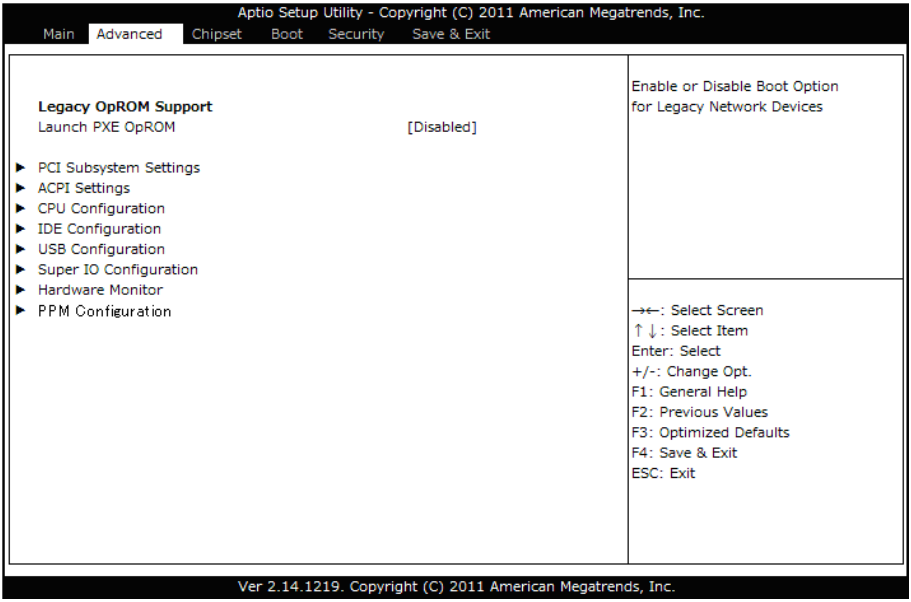


Figure 5.2 Advanced menu

Settings that can be configured in the Advanced menu are described in the table below.

Table 5.3 Advanced Menu Selections

Item	Options	Description
Launch PXE OpROM	[Disabled] Enabled	Enables or disables the PXE boot.

The following sub items are available:

PCI Subsystem Settings
Use this menu to specify PCI Subsystem Settings.

ACPI Settings
Use this menu to specify ACPI power management settings.

CPU Configuration
Use this menu to specify CPU Configuration.

IDE Configuration
Use this menu to specify IDE controller settings.

USB Configuration
Use this menu to specify USB Configuration.

Super I/O Configuration
Use this menu to specify Super I/O Configuration.

Hardware Monitor
Use this menu to specify Hardware Monitor.

PPM Configuration
Specify the Intel energy-saving function settings.

PCI Subsystem Settings

Use this menu to specify PCI Subsystem Settings.

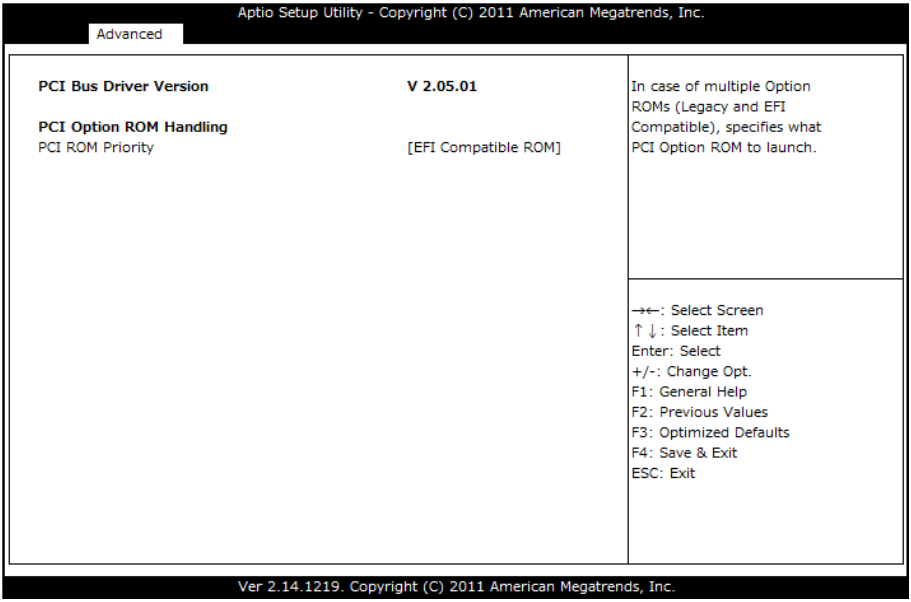

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
PCI Bus Driver Version
V 2.05.01
PCI Option ROM Handling
PCI ROM Priority
[EFI Compatible ROM]
In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCI Option ROM to launch.
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.3 PCI Subsystem Settings

Items that can be configured for PCI subsystem settings are described in the table below.

Table 5.4 PCI Subsystem Settings

Item	Options	Description
PCI ROM Priority	Legacy ROM EFI Compatible ROM	In case of multiple Option ROMs (Legacy and EFI Compatible), specifies what PCI Option ROM to launch. This setting is for later expansion boards, so do not change this setting.

ACPI Settings

Use this menu to specify ACPI power management settings.

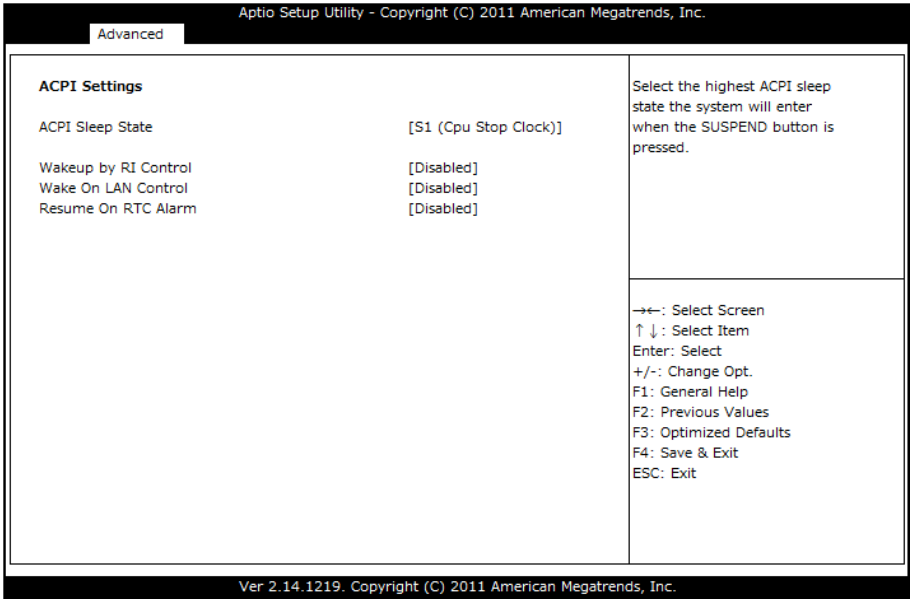


Figure 5.4 ACPI Settings

Settings that can be configured in the ACPI Settings are described in the table below.

Table 5.5 ACPI Settings

Item	Options	Description
ACPI Sleep State	Suspend Disabled [S1 (CPU Stop Clock)] S3 (Suspend to RAM)	Selects the ACPI sleep mode used when the system switches to the suspended state. Do not change this setting.
Wakeup by RI Control	[Disabled] Enabled	Enable / Disable Wakeup by Ring function.
Wake On LAN Control	[Disabled] Enabled	Enable / Disable Wake On LAN function.
Resume On RTC Alarm	[Disabled] Enabled	Enables or disables the function for automatically turning the system on at the specified date and time. When this is enabled, use the following items to set the date and time at which the system will automatically turn on.
RTC Wake up Day	0 - 31	Sets the day at which the system will automatically turn on. If this is set to 0, the system will turn on each day.
RTC Wake up Hour	0 - 23	Sets the hour at which the system will automatically turn on.
RTC Wake up Minute	0 - 59	Sets the minute at which the system will automatically turn on.
RTC Wake up Second	0 – 59	Sets the second at which the system will automatically turn on.

CPU Configuration

Use this menu to specify CPU Configuration.

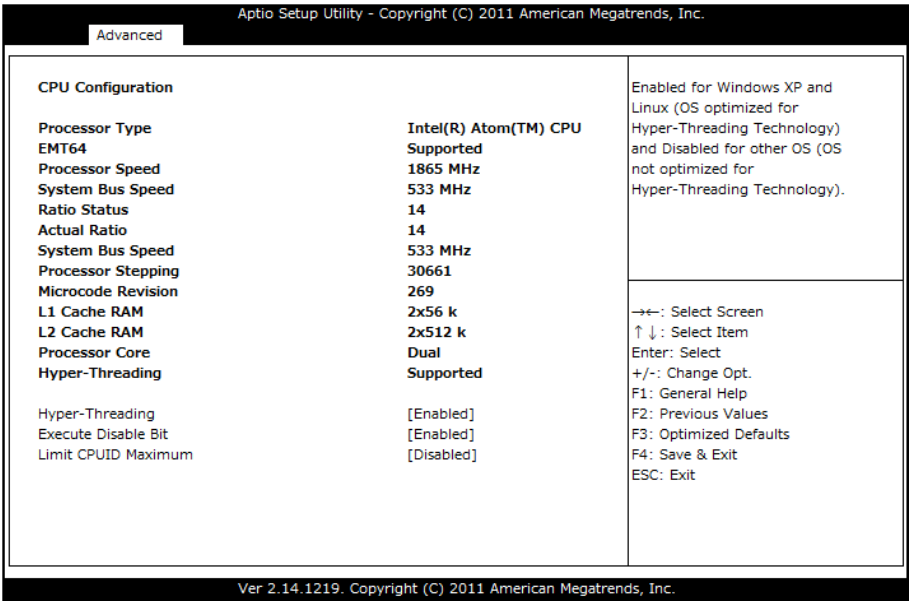


Figure 5.5 CPU Configuration

Settings that can be configured in the CPU Configuration are described in the table below.

Table 5.6 CPU Configuraiton

Item	Options	Description
Hyper-Threading	Disabled [Enabled]	Enables or disables the Hyper-Threading function. Normally do not change this setting.
Execute Disable Bit	Disabled [Enabled]	Enables or disables the Execute Disable function. Do not change this setting.
Limit CPUID Maximum	[Disabled] Enabled	Enables or disables the CPUID limit. Normally do not change this setting.

IDE Configuration

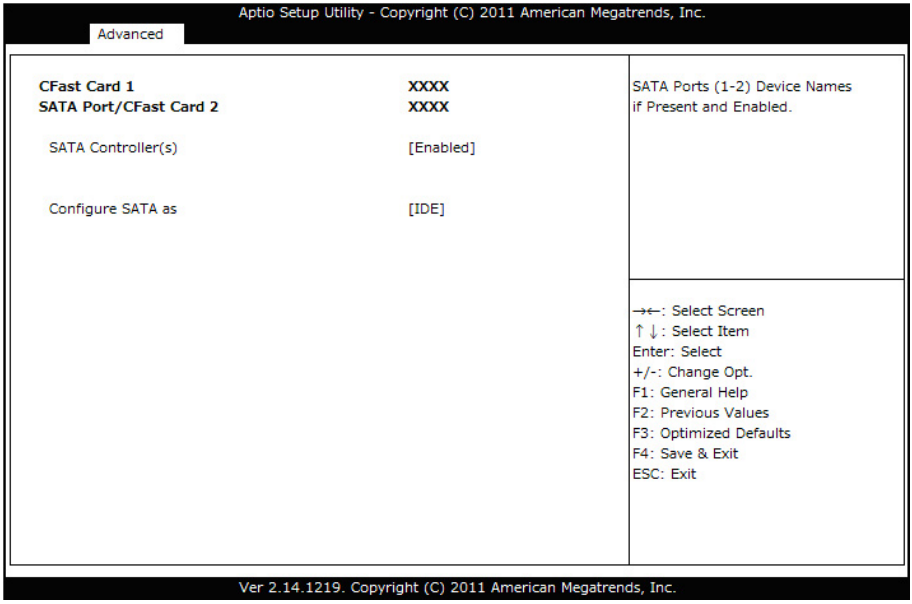


Figure 5.6 IDE Configuration

Settings that can be configured in the IDE Configuration are described in the table below.

Table 5.7 IDE Configuraiton

Item	Options	Description
SATA Controller(s)	Disabled [Enabled]	Enables or disables the SATA port (for the CFast card). Normally do not change this setting.
Configure SATA as	[IDE] AHCI	Select a configuration for SATA Controller. * If you change the operation mode, the OS will have to be reinstalled. Normally do not change this setting.

USB Configuration

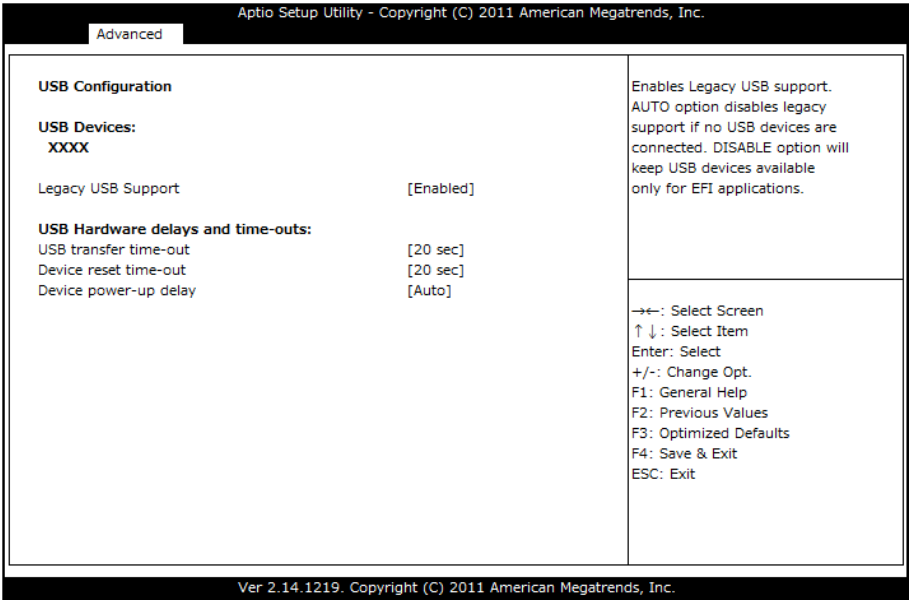

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
USB Configuration
USB Devices:
XXXX
Legacy USB Support
[Enabled]
USB Hardware delays and time-outs:
USB transfer time-out
[20 sec]
Device reset time-out
[20 sec]
Device power-up delay
[Auto]
Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.7 USB Configuration

Settings that can be configured in the USB Configuration are described in the table below.

Table 5.8 USB Configuraiton

Item	Options	Description
USB Devices :	-	Displays the names of the connected USB devices.
Legacy USB Support	[Enabled] Disabled Auto	Sets the USB keyboard support for operating systems that do not support USB devices. Normally do not change this setting.
USB transfer time-out	1 sec 5 sec 10 sec [20 sec]	Sets the timeout time for USB data transfers. Normally do not change this setting.
Device reset time-out	10 sec [20 sec] 30 sec 40 sec	Sets the timeout time to use when resetting high-capacity USB storage devices. Normally do not change this setting.
Device power-up delay	[Auto] Manual	Sets the standby time for recognizing USB devices. When this is set to "Manual," you can use the following item to change the standby time for recognizing USB devices.
Device power-up delay in seconds	1..40	Sets the standby time for recognizing USB devices (1 to 40 seconds). When you connect a USB device that requires a long time to be recognized, such as a DVD drive, you can improve device recognition by increasing the standby time.

Super I/O Configuration

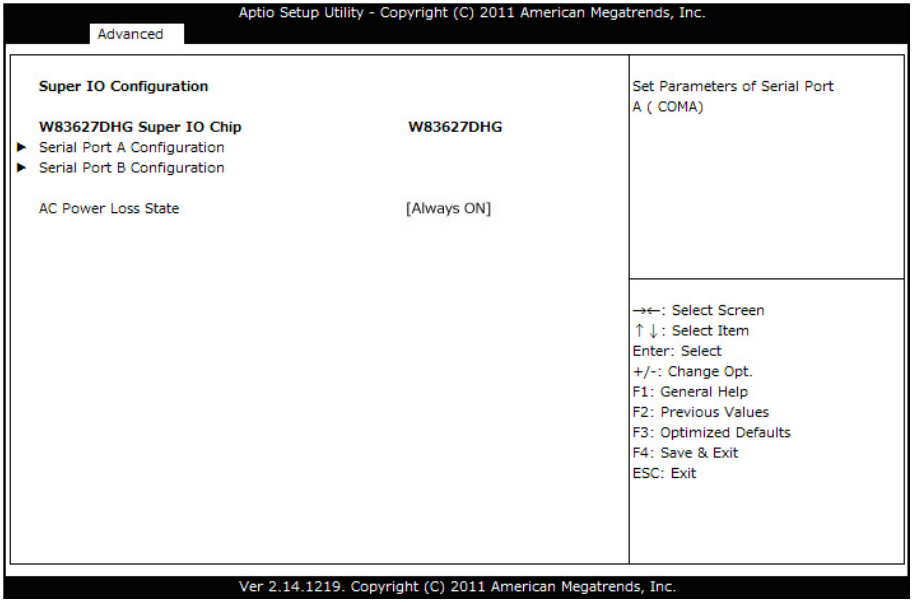


Figure 5.8 Super I/O Configuration

Settings that can be configured in the Super I/O Configuration are described in the table below.

Table 5.9 Super I/O Configuration

Item	Options	Description
AC Power Loss State	Always OFF Always ON Last State	Sets whether to start the system at the same point in time that the power supply starts. Always OFF : Press the power button to start the system. The system does not start at the same point in time that the power supply starts. Always ON : The system starts at the same point in time that the power supply starts. Last State : If the power is turned off while the system is on, the next time the power supply starts, the system will start. If the power is turned off while the system is not on, the next time the power supply starts, the system will not start.

The following sub items are available:

Serial Port x Configuration (x = A..B)
Use this menu to specify settings for serial ports A to B.

Serial Port A Configuration

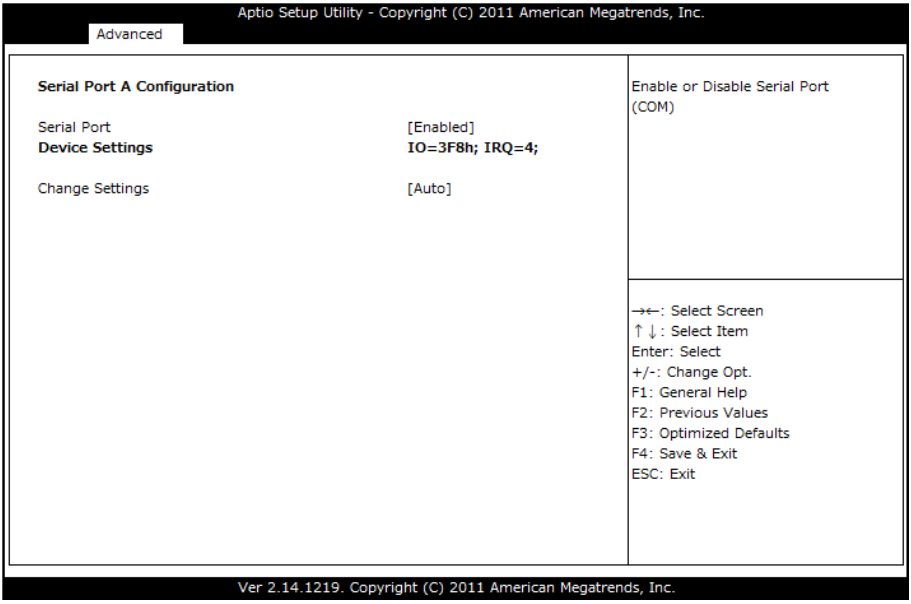


Figure 5.9 Serial Port A Configuration

Settings that can be configured in the Serial Port A Configuration are described in the table below.

Table 5.10 Serial Port A Configuration

Item	Options	Description
Serial Port	Disabled [Enabled]	Enable or Disable Serial Port A (COM A).
Change Settings	[Auto] IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Sets the base address and interrupt of serial port A (COM A). Normally set this to "Auto".

Serial Port B Configuration

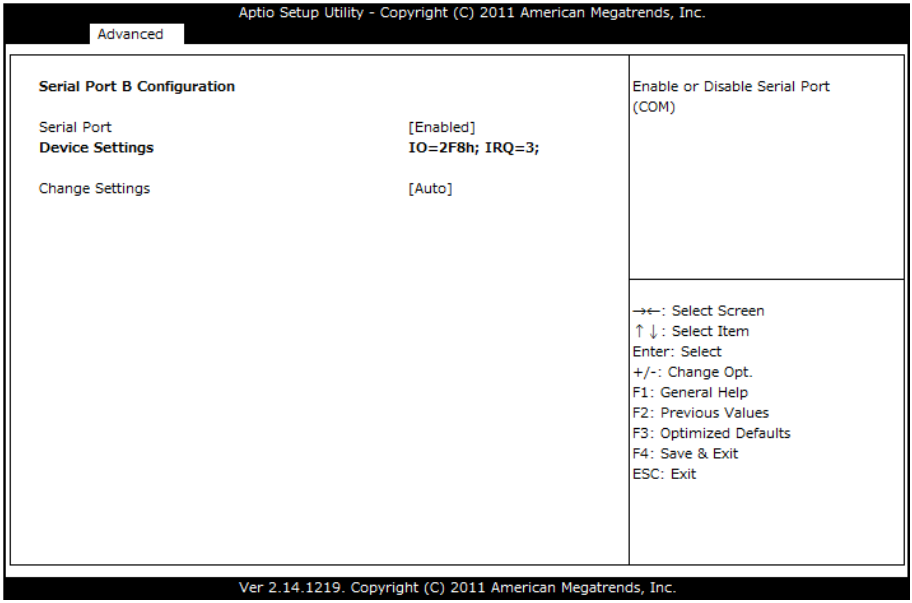


Figure 5.10 Serial Port B Configuration

Settings that can be configured in the Serial Port B Configuration are described in the table below.

Table 5.11 Serial Port B Configuration

Item	Options	Description
Serial Port	Disabled [Enabled]	Enable or Disable Serial Port B (COM B).
Change Settings	[Auto] IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,10,11,12;	Sets the base address and interrupt of serial port B (COM B). Normally set this to "Auto".

Hardware Monitor

Use this menu to check CPU temperature, system temperature, input voltage, and other system conditions.

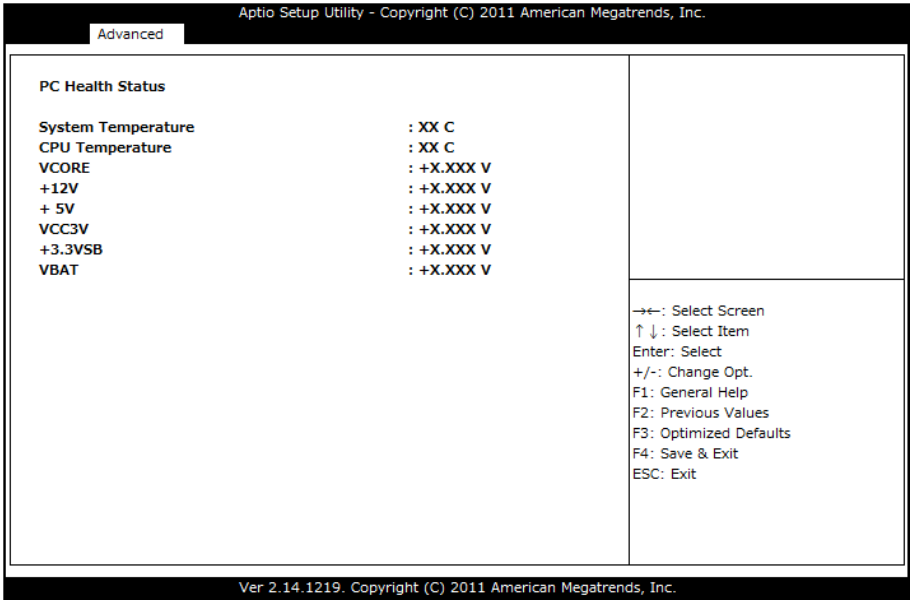

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Advanced
PC Health Status
System Temperature : XX C
CPU Temperature : XX C
VCORE : +X.XXX V
+12V : +X.XXX V
+ 5V : +X.XXX V
VCC3V : +X.XXX V
+3.3VSB : +X.XXX V
VBAT : +X.XXX V
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.11 Hardware Monitor

PPM Configuration

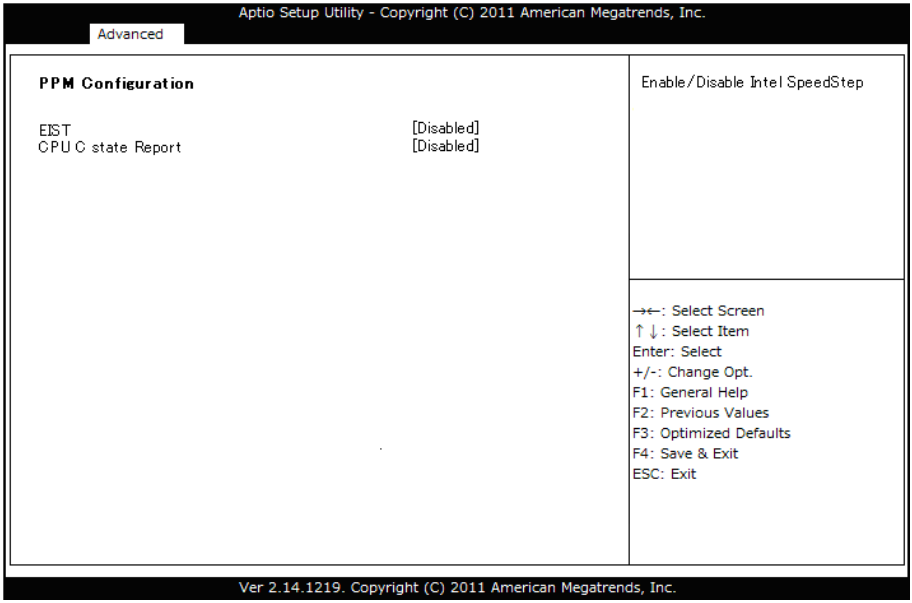


Figure 5.12 PPM Configuration

Settings that can be configured in the PPM Configuration are described in the table below.

Table 5.12 PPM Configuration

Item	Options	Description
EIST	[Disabled] Enabled	Enables or disables the Intel SpeedStep function. When this is set to "Enabled," the CPU speed changes to match the load.
CPU C state Report	[Disabled] Enabled	Enables or disables the Intel energy-saving function (C state).

Chipset

Use this menu to specify advanced chipset settings.

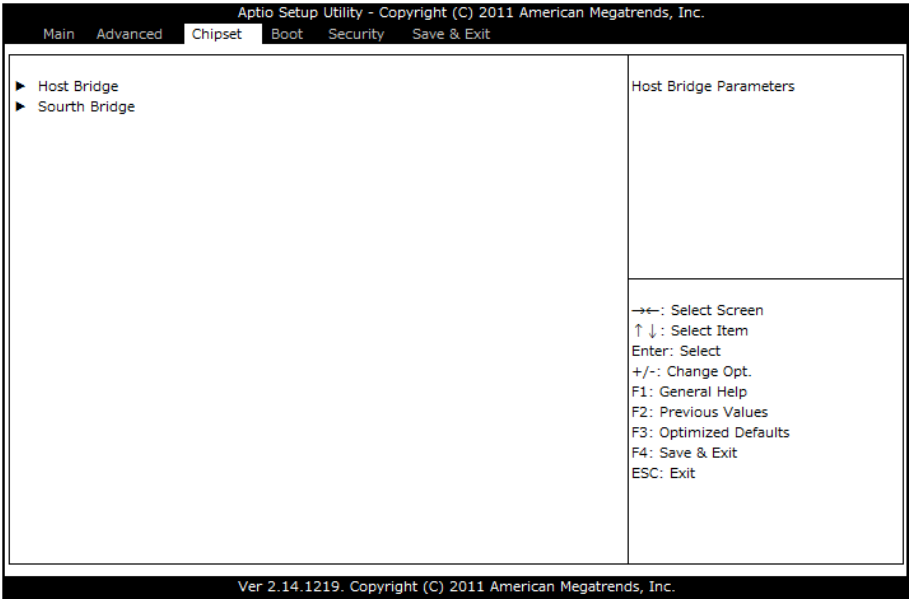


Figure 5.13 Chipset menu

The following sub items are available:

Host Bridge
Use this menu to specify Host Bridge settings.

South Bridge
Use this menu to specify South Bridge.

Host Bridge

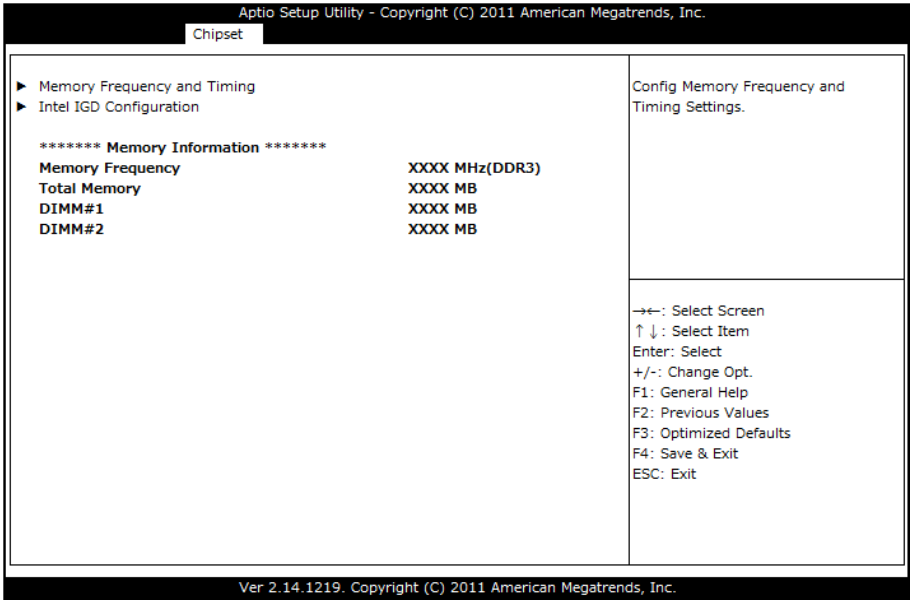

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
▶ Memory Frequency and Timing
▶ Intel IGD Configuration
******* Memory Information *******
Memory Frequency XXXX MHz(DDR3)
Total Memory XXXX MB
DIMM#1 XXXX MB
DIMM#2 XXXX MB
Config Memory Frequency and Timing Settings.
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.14 Host Bridge

The following sub items are available:

Memory Frequency and Timing

Intel IGD Configuration

Memory Frequency and Timing

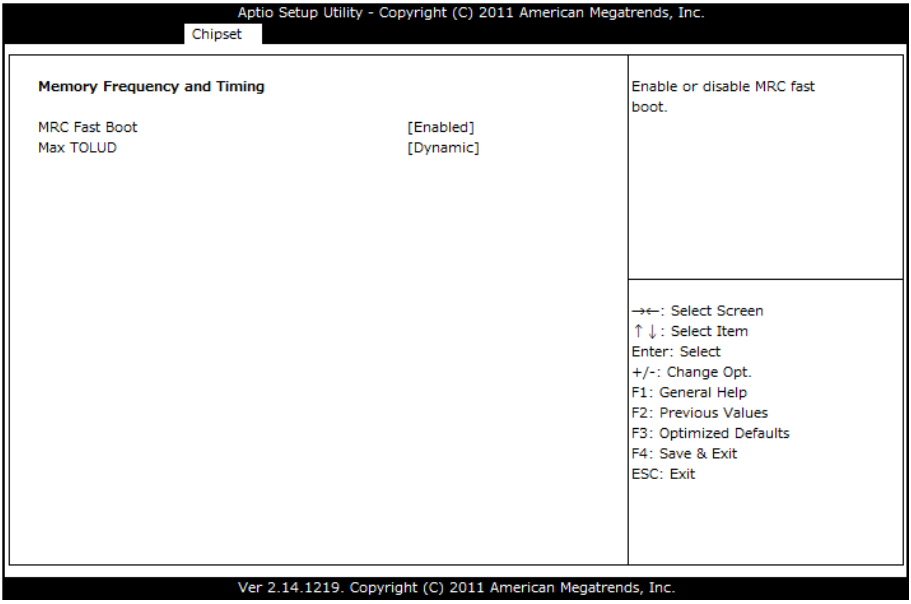


Figure 5.15 Memory Frequency and Timing

Settings that can be configured in the Memory Frequency and Timing are described in the table below.

Table 5.13 Memory Frequency and Timing

Item	Options	Description
MRC Fast Boot	Disabled [Enabled]	Enable or disable MRC fast boot. Do not change this setting.
Max TOLUD	[Dynamic] 1 GB 1.25 GB 1.5 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB	Sets the maximum TOLUD size. Do not change this setting.

Intel IGD Configuration

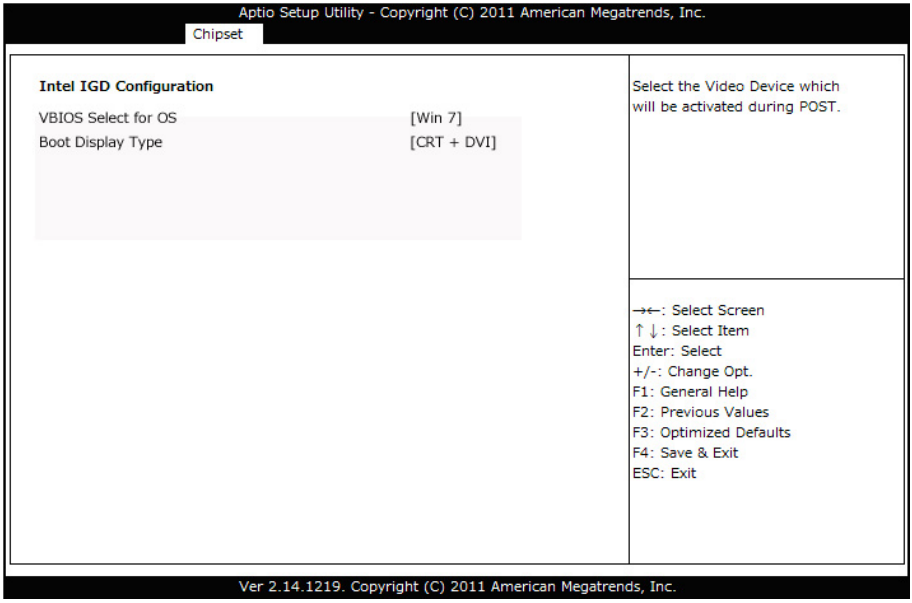


Figure 5.16 Intel IGD Configuration

Settings that can be configured in the Intel IGD Configuration are described in the table below.

Table 5.14 Intel IGD Configuration

Item	Options	Description
VBIOS Select for OS	Win7 Other	Selects the VBIOS setting. To use Windows 7, set this to "Win 7," to use another OS, set this to "Other". * When the BIOS default settings are loaded, this is set to "Win 7". * After you install the OS, do not change this setting.
Boot Display Type	CRT DVI CRT+DVI	Selects the display for the BIOS SETUP screen. This is set as shown below when the product is shipped. BX-955SD-DC6000 : CRT+DVI BX-955S-DC6311 : CRT BX-955SD-DC6311 : DVI BX-955SD-DC6312 : CRT+DVI * When the BIOS default settings are loaded, this is set to "CRT + DVI".

South Bridge

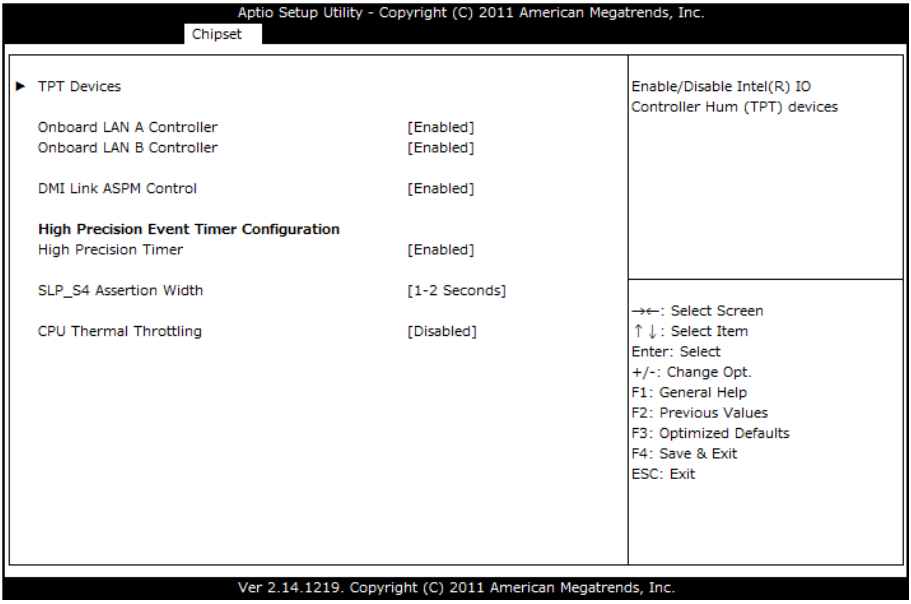

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
▶ TPT Devices
Onboard LAN A Controller [Enabled]
Onboard LAN B Controller [Enabled]
DMI Link ASPM Control [Enabled]
High Precision Event Timer Configuration
High Precision Timer [Enabled]
SLP_S4 Assertion Width [1-2 Seconds]
CPU Thermal Throttling [Disabled]
Enable/Disable Intel(R) IO Controller Hum (TPT) devices
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.17 South Bridge

Settings that can be configured in the South Bridge are described in the table below.

Table 5.15 South Bridge

Item	Options	Description
Onboard LAN A Controller	Disabled [Enabled]	Enable / Disable Onboard LAN A Controller.
Onboard LAN B Controller	Disabled [Enabled]	Enable / Disable Onboard LAN B Controller.
DMI Link ASPM Controll	Disabled [Enabled]	Enables or disables the ASPM control with the DMI link. Normally do not change this setting.
High Precision Timer	Disabled [Enabled]	Enables or disables the high-precision event timer. Normally do not change this setting.
SLP_S4 Assertion Width	[1-2 Seconds] 2-3 Seconds 3-4 Seconds 4-5 Seconds	Sets the minimum assertion time of the S4 signal. Normally do not change this setting.
CPU Thermal Throttling	[Disabled] 12.5% 25% 37.5% 50% 62.5% 75% 87.5%	Sets the clock reduction rate when the CPU temperature increases.

Item	Options	Description
Threshold Temperature	[Disabled] 50 C/122 F 55 C/131 F 60 C/140 F 65 C/149 F 70 C/158 F 75 C/167 F 70 C 176 F	Sets the temperature at which to start reducing the clock when the CPU temperature increases.

The following sub items are available:

TPT Devices
Use this menu to specify Intel IO Controller Hub(TPT) settings.

TPT Devices

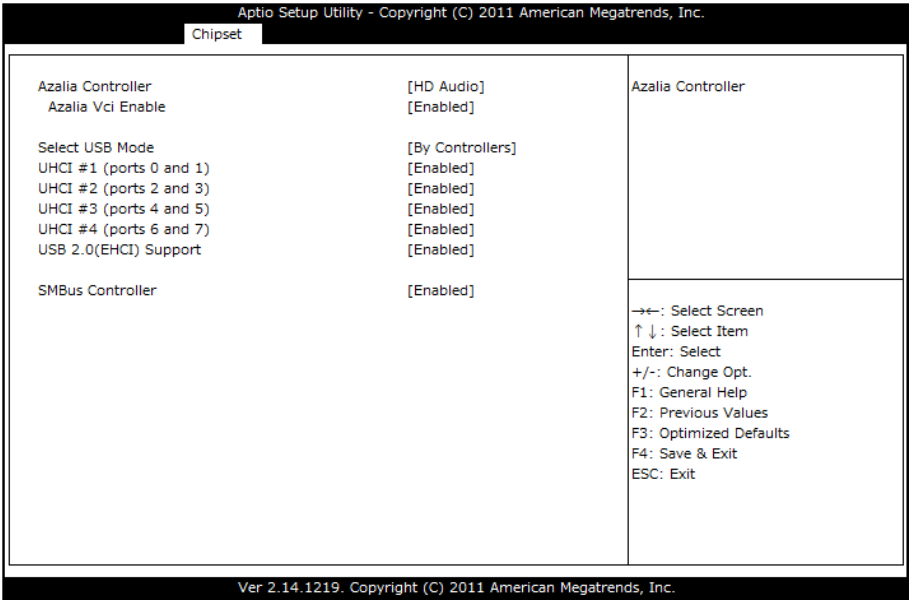
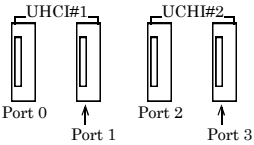

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Chipset
Azalia Controller [HD Audio]
Azalia Vci Enable [Enabled]
Select USB Mode [By Controllers]
UHCI #1 (ports 0 and 1) [Enabled]
UHCI #2 (ports 2 and 3) [Enabled]
UHCI #3 (ports 4 and 5) [Enabled]
UHCI #4 (ports 6 and 7) [Enabled]
USB 2.0(EHCI) Support [Enabled]
SMBus Controller [Enabled]
Azalia Controller
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.18 TPT Devices

Settings that can be configured in the TPT Devices are described in the table below.

Table 5.16 TPT Devices

Item	Options	Description
Azalia Controller	Disabled [HD Audio]	Enables or disables the Azalia sound controller. Normally do not change this setting.
Azalia Vci Enable	Disabled [Enabled]	Enables or disables the Azalia Vci. Normally do not change this setting.
Select USB Mode	[By Controllers] By Ports onry	Selects how to specify the USB port to use. Normally do not change this setting. By Controllers : The USB port to use is specified by the UHCI controllers. - External USB port  UCCI#3, #4 : Internal USB port By Ports Only : The USB port to use is specified by its port number.

Item	Options	Description
UHCI #1 (ports 0 and 1)	Disabled [Enabled]	(When the USB mode is set to "By Controllers".) Enables or disables USB ports 0 and 1. Normally do not change this setting.
UHCI #2 (ports 2 and 3)	Disabled [Enabled]	(When the USB mode is set to "By Controllers".) Enables or disables USB ports 2 and 3. Normally do not change this setting.
UHCI #3 (ports 4 and 5)	Disabled [Enabled]	(When the USB mode is set to "By Controllers".) Enables or disables USB ports 4 and 5. Normally do not change this setting.
UHCI #4 (ports 6 and 7)	Disabled [Enabled]	(When the USB mode is set to "By Controllers".) Enables or disables USB ports 6 and 7. Normally do not change this setting.
USB Function	Disabled 1 USB Ports 2 USB Ports 3 USB Ports 4 USB Ports 5 USB Ports 6 USB Ports 7 USB Ports [8 USB Ports]	(When the USB mode is set to " By Ports only".) Sets USB function. 1 - 4 : External USB port 5 - 8 : Internal USB port
USB 2.0(EHCI) Support	Disabled [Enabled]	Enable or Disable USB 2.0 (EHCI) Support. Normally do not change this setting.
SMBus Controller	Disabled [Enabled]	Enable or Disable SMBus Controller. Normally do not change this setting.

Boot

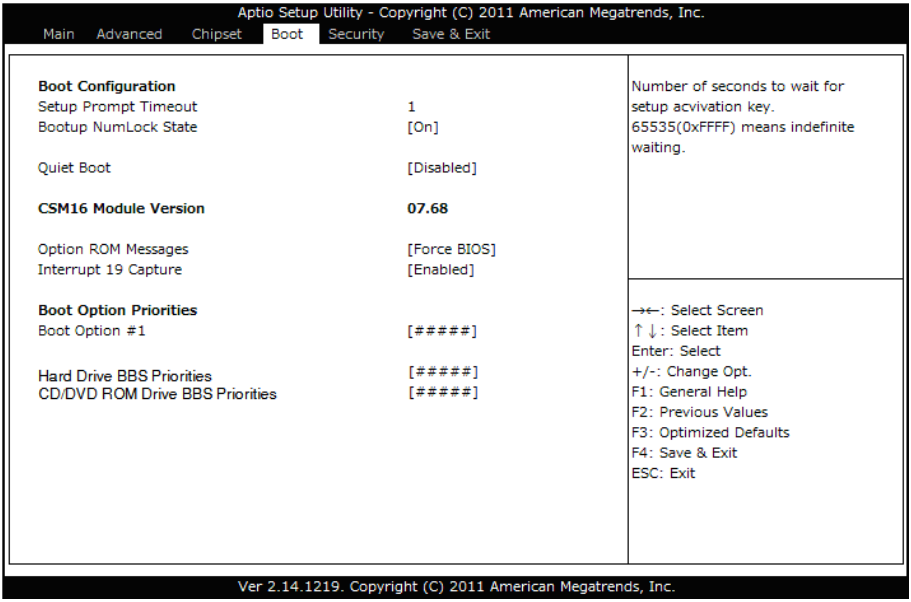

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Boot Configuration
Setup Prompt Timeout 1
Bootup NumLock State [On]
Quiet Boot [Disabled]
CSM16 Module Version 07.68
Option ROM Messages [Force BIOS]
Interrupt 19 Capture [Enabled]
Boot Option Priorities
Boot Option #1 [*****]
Hard Drive BBS Priorities [*****]
CD/DVD ROM Drive BBS Priorities [*****]
Number of seconds to wait for setup acvivation key. 65535(0xFFFF) means indefinite waiting.
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.19 Boot menu

Use this menu to specify settings related to system startup. The following items are available:

Table 5.17 Boot

Item	Options	Description
Setup Prompt Timeout	1 - 65535	Sets the timeout time (in seconds) after which the system switches to the BIOS setup screen. Set this to "65535" to make the system wait until it receives key input.
Bootup NumLock State	[On] Off	Sets the initial state of the Num Lock key on the USB keyboard.
Quiet Boot	Enabled [Disabled]	Enables or disables Quiet Boot option If you set this to "Enabled," information will not be displayed, which shortens the time that it takes the system to start.
Option ROM Messages	[Force BIOS] Keep Current	Sets the display of the BIOS message that appears when you connect an optional ROM. Normally do not change this setting.
Interrupt 19 Capture	Disabled [Enabled]	Enables or disables optional ROM interrupts. Normally do not change this setting.
Boot Option #x	XXXXXXXXX (Specify an arbitrary device.)	Sets the order of bootable devices that are connected.
CD/DVD ROM Drive BBS Priorities	XXXXXXXXX (Specify an arbitrary device.)	Specifies the start order of the connected CD or DVD drives.
Hard Drive BBS Priorities	XXXXXXXXX (Specify an arbitrary device.)	Specifies the start order of the connected CFast or USB removable drives.

⚠ CAUTION

- In the Boot Option #x list, the same device may be displayed as shown below.
  (1) USB Disk
  (2) UEFI：USB Disk
  In this situation, select (1) to perform legacy booting in which the disk is assumed to be MBR formatted and (2) to perform UEFI booting in which the disk is assumed to be GPT formatted. Be sure to specify (1) for the boot setting. Booting with option (2) is not supported.
- Only the devices set with high priorities with the other settings such as CD/DVD ROM Drive BBS Priorities can be selected in the Boot Option #x lists.

Security

Use this menu to configure system security settings.

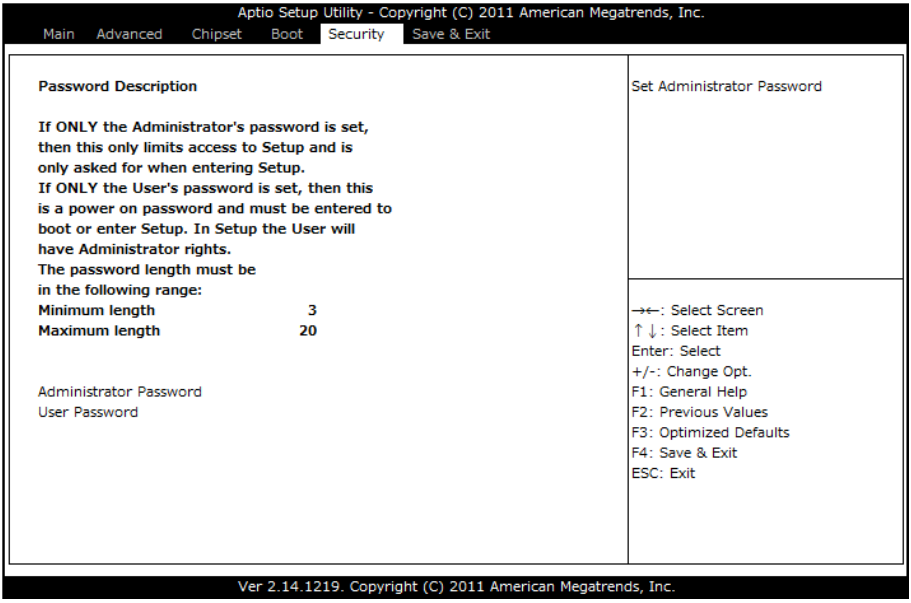

Aptio Setup Utility – Copyright (C) 2011 American Megatrends, Inc.
Main Advanced Chipset Boot Security Save & Exit
Password Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.
If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.
The password length must be in the following range:
Minimum length 3
Maximum length 20
Administrator Password
User Password
Set Administrator Password
→←: Select Screen
↑ ↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit
Ver 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.

Figure 5.20 Security menu

The following items are available:

Administrator Password

When you press <Enter> on this item, you are required to input the password as below.

Create New Password	[****]
Confirm New Password	[****]

Enter a password of between 3 and 20 characters twice.

To nullify the password, go to the Administrator Password Input Screen again.

Enter Current Password	[****]
Create New Password	[ ]
Confirm New Password	[ ]

When you input old password in the initial item and then press <Enter> by inputting nothing to the new password item, the password will be nullified.

User Password

When you press <Enter> on this item, you are required to input the password as below.

Create New Password	[****]
Confirm New Password	[****]

Enter a password of between 3 and 20 characters twice.

Follow the same procedure as Administrator Password to nullify the password.

⚠ CAUTION

If you forget the password, the product will have to be repaired.

Save & Exit

Use this menu to load/save settings changes, and exit the setup menu.

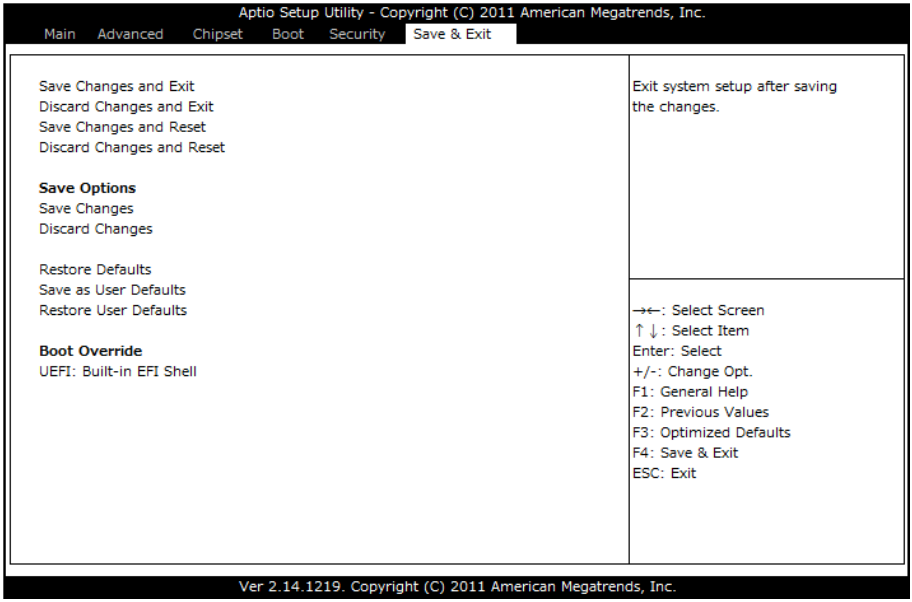


Figure 5.21 Save & Exit menu

The following items are available:

Save Changes and Exit

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Save & Exit Setup
Save configuration and exit?
[Yes] [No]

Select "[Yes]" to record the selections that you made on the menu to the FLASH ROM. Depending on the changed items, the system may restart. The next time the computer is booted, the BIOS configures the system based on the configuration stored in FLASH ROM.

Pressing [No], it will return to setup menu.

Discard Changes and Exit

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

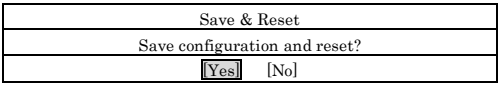
Exit Without Saving
Quit without saving?
[Yes] [No]

Pressing [Yes] continues to boot the system without saving any changes made in FLASH ROM.

Pressing [No] returns to the setup menu without records in FLASH ROM.

Save Changes and Reset

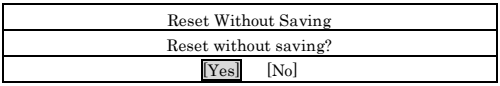
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:



Pressing [Yes] saves any changes made in FLASH ROM and reboots the system. The next time the computer is booted, the BIOS configures the system based on the configuration stored in FLASH ROM.
Pressing [No], it will return to setup menu.

Discard Changes and Reset

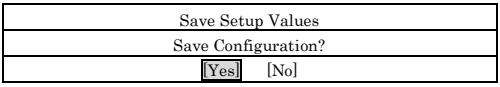
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:



Pressing [Yes] reboots the system without saving any changes made in FLASH ROM.
Pressing [No] returns to the setup menu without records in FLASH ROM.

Save Changes

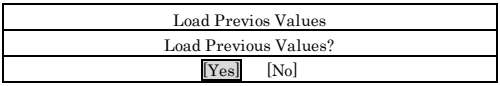
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:



Pressing [Yes] saves any changes made in FLASH ROM and takes you back to the setup menu.
Pressing [No], it will return to setup menu.

Discard Changes

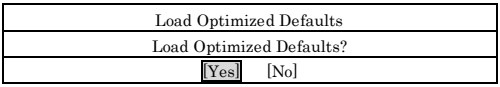
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:



Pressing [Yes] discards any changes made and takes you back to the setup menu after loading the previous settings saved in FLASH ROM.
Pressing [No], it will return to setup menu.

Restore Defaults

When you press <Enter> on this item you get a confirmation dialog box with a message similar to:



Select "[Yes]" to load the default values of the factory settings to use in operating the system. This setting will not take effect until you save to FLASH ROM.
Pressing [No] returns to the setup menu without loading.

Save as User Defaults
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Save Values as User Defaults
Save Configuration?
[Yes] [No]

Pressing [Yes] saves the current settings as the user default settings in FLASH ROM and takes you back to the setup menu.
Pressing [No], it will return to setup menu.

Restore User Defaults
When you press <Enter> on this item you get a confirmation dialog box with a message similar to:

Restore User Defaults
Restore User Defaults?
[Yes] [No]

Pressing [Yes] loads the settings saved in FLASH ROM as the user default settings and takes you back to the setup menu. This setting is not reflected to the FLASH ROM until you save it.
Pressing [No], it will return to setup menu.

Boot Override
Using the cursor to select the device that you want to start and pressing <Enter> key directly boots the selected device regardless of the order set in the Boot menu.

POST Beep

Currently there are two kinds of beep codes in BIOS. This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by two short beeps. The other code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

Position and Settings of the ROM Clear Switches

If the BIOS settings cause unexpected system start errors, you can set the ROM clear switches and start the system to disable the BIOS settings and start the system.
During normal operation, leave the ROM clear switches in their factory default settings (HSW2-1 is in the ON position).

⚠ CAUTION

This product's heat sink may reach high temperatures. Touching this product immediately after it is turned off may lead to burns. Wait until the product has cooled down before you configure the switch settings.

(1) Remove the rear surface cover from the product.
(Number of screws Cover : 3)
When you remove the rear surface cover, ther ROM clear dip switches (HSW2 and HSW3) are arranged as shown in the following figure.

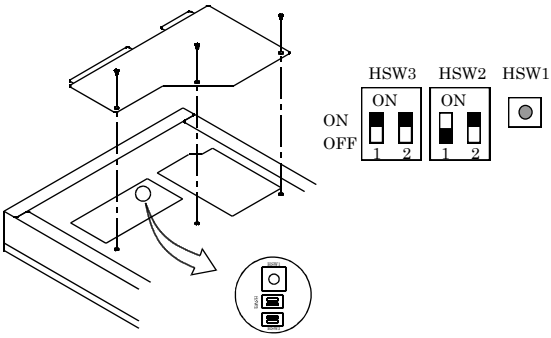


Figure 5.22 ROM clear jumper positions when the cover and heat sink are removed

(2) Set switch 1 of ROM clear dip switch HSW2 to the OFF position.
(3) Reattach the cover to the product. Do not apply excessive force when tightening the screws.
(4) Turn the power on. After you hear a beep, turn the power off.
(6) Remove the cover, and then return switch 1 of ROM clear dip switch HSW2 to the ON position.
(7) Attach the cover.

⚠ CAUTION

- If you tighten the screws with a tightening torque greater than that specified, the screw holes may be damaged.
  The appropriate tightening torque for the screws is 1 to 1.5 kgf•cm.
- Pay attention to the following points when removing the screws that are used to fix the rear surface cover in place.
  Performing the operations incorrectly may damage the screw holes.
- When removing the cover, use a screwdriver with the following type of tip.
  Cover : (+)No.0
- When removing the cover screws, do not use an electronic screwdriver.

6. Appendix

Memory Map

Table 6.1. Memory Map

Memory Segments	Comments
00000h - 9FFFh	0 - 640K DOS Region
A0000h – BFFFFh	Video Buffer
B0000h - B7FFFh	Monochrome Adapter range
C0000h – CFFFFh	Video BIOS
D0000h – DFFFFh	Expansion Area
E0000h – EFFFFh	Extended System BIOS Area
F0000h – FFFFFh	System BIOS Area
100000h – FFFFFFFFh	Extended Memory Area
100000h - Top of Main Memory	Main DRAM Address Range
Top of Main Memory	Extended SMRAM Address Range
Top of Main Memory To 4GB	PCI Memory Address Range
FEC0000h - FECFFFFFh,	APIC Configuration space
FFE00000h – FFFFFFFFh	High BIOS Area

I/O Port Addresses

Table 6.2. I/O Port Addresses ***< 1 / 2 >***

Address	Size	Description
0000 - 001F	32 bytes	DMA controller
0020 - 0021	2 bytes	Interrupt controller
0024 - 0025	2 bytes	Interrupt controller
0028 - 0029	2 bytes	Interrupt controller
002C – 002D	2 bytes	Interrupt controller
002E – 002F	2 bytes	LPC SIO
0030 – 0031	2 bytes	Interrupt controller
0034 - 0035	2 bytes	Interrupt controller
0038 - 0039	2 bytes	Interrupt controller
003C – 003D	2 bytes	Interrupt controller
0040 - 0043	4 bytes	Timer / Counter
004E – 004F	2 bytes	LPC SIO
0050 - 0053	4 bytes	Timer / Counter
0060	1 byte	Kerboard controller
0061	1 byte	NMI controller
0062	1 byte	Microcontroller
0064	1 byte	Kerboard controller
0066	1 byte	Microcontroller
0070 - 0077	8 bytes	NMI / real time clock controller
0080 – 0091	18 bytes	DMA controller / LPC / PCI
0092	1 byte	Reset generator
0093 – 009F	13 bytes	DMA controller
00A0 – 00A1	2 bytes	Interrupt controller
00A4 – 00A5	2 bytes	Interrupt controller
00A8 – 00A9	2 bytes	Interrupt controller
00AC – 00AD	2 bytes	Interrupt controller
00B0 – 00B1	2 bytes	Interrupt controller
00B2 – 00B3	2 bytes	Power management
00B4 – 00B5	2 bytes	Interrupt controller
00B8 – 00B9	2 bytes	Interrupt controller
00BC – 00BD	2 bytes	Interrupt controller
00C0 – 00DF	32 bytes	DMA controller
00F0	1 byte	Interrupt controller
0170 - 0177	8 bytes	IDE / SATA controller, PCI
01F0 – 01F7	8 bytes	IDE / SATA controller, PCI
0200 – 020F	16 bytes	Reserved
0260 - 0267	8 bytes	Reserved
0268 – 026F	8 bytes	Reserved
0270 – 0277	8 bytes	Reserved
0278 – 027F	8 bytes	Reserved
02F8 – 02FF	8 bytes	SERIAL B
0376	1 byte	IDE / SATA controller, PCI
03B0 – 03BB	13 bytes	Graphics
03C0 – 03DF	32 bytes	Graphics

Table 6.2. I/O Port Addresses *< 2 / 2 >*

Address	Size	Description
03F6	1 byte	IDE / SATA controller, PCI
03F8 – 03FF	8 bytes	SERIAL A
0400 – 043F	64 bytes	Power management
04D0 – 04D1	2 bytes	Interrupt controller
0500 – 053F	64 bytes	Reserved (GPIO)
0CF9	1 byte	Reset generator
0D00 – 0FFFF	62208 bytes	PCI bus

Interrupt Level List

Table 6.3. Hardware Interrupt Levels (Factory Settings)

Type	8259	Priority	Description	Vector
NMI		High	-I/O CHK	02H
IRQ0	MASTER	↑	Timer 0	08H
IRQ1	"	|	Reserved	09H
IRQ2	"	|	Interrupt Controller 2 (Slave)	0AH
IRQ8	SLAVE	|	Realtime Clock	70H
IRQ9	"	|	Reserved	71H
IRQ10	"	|	Reserved	72H
IRQ11	"	|	Reserved	73H
IRQ12	"	|	Reserved	74H
IRQ13	"	|	Co-processor	75H
IRQ14	"	|	Not used (Useable for user)	76H
IRQ15	"	|	Not used (Useable for user)	77H
IRQ3	MASTER	|	Serial port B(COM B)	0BH
IRQ4	"	|	Serial port A(COM A)	0CH
IRQ5	"	|	System reserved	0DH
IRQ6	"	↓	Not used (Useable for user)	0EH
IRQ7	"	Low	System reserved	0FH

POST Codes

Table 6.4. POST Codes ***< 1 / 3 >***

POST (hex)	Description
< Security (SEC) phase >	
1h	Power on. Reset type detection (software / hardware)
2h	AP initialization before microcode loading
3h	North Bridge initialization before microcode loading
4h	South Bridge initialization before microcode loading
5h	OEM initialization before microcode loading
6h	Microcode loading
7h	AP initialization after microcode loading
8h	North Bridge initialization after microcode loading
9h	South Bridge initialization after microcode loading
Ah	OEM initialization after microcode loading
Bh	Cache initialization
< Pre-EFI Initialization (PEI) phase >	
10h	PEI Core is started
11h	Pre-memory CPU initialization is started
12h – 14h	Pre-memory CPU initialization (CPU module specific)
15h	Pre-memory North Bridge initialization is started
16h – 18h	Pre-Memory North Bridge initialization (North Bridge module specific)
19h	Pre-memory South Bridge initialization is started
1Ah – 1Ch	Pre-memory South Bridge initialization (South Bridge module specific)
1Dh – 2Ah	OEM pre-memory initialization codes
2Bh	Memory initialization. Serial Presence Detect (SPD) data reading
2Ch	Memory initialization. Memory presence detection
2Dh	Memory initialization. Programming memory timing information
2Eh	Memory initialization. Configuring memory
2Fh	Memory initialization (other).
30h	Reserved for ASL (see ASL Status Codes section below)
31h	Memory Installed
32h	CPU post-memory initialization is started
33h	CPU post-memory initialization. Cache initialization
34h	CPU post-memory initialization. Application Processor(s) (AP) initialization
35h	CPU post-memory initialization. Boot Strap Processor (BSP) selection
37h	CPU post-memory initialization. System Management Mode (SMM) initialization
38h	Post-Memory North Bridge initialization is started
39h – 3Ah	Post-Memory North Bridge initialization (North Bridge module specific)
3Bh	Post-Memory South Bridge initialization is started
3Ch – 3Eh	Post-Memory South Bridge initialization (South Bridge module specific)
3Fh – 4Eh	OEM post memory initialization codes
4Fh	DXE IPL is started
< Driver Execution Environment (DXE) phase >	
60h	DXE Core is started
61h	NVRAM initialization
62h	Installation of the South Bridge Runtime Services
63h	CPU DXE initialization is started
64h-67h	CPU DXE initialization (CPU module specific)
68h	PCI host bridge initialization

Table 6.4. POST Codes *< 2 / 3 >*

POST (hex)	Description
69h	North Bridge DXE initialization is started
6Ah	North Bridge DXE SMM initialization is started
6Bh - 6Fh	North Bridge DXE initialization (North Bridge module specific)
70h	South Bridge DXE initialization is started
71h	South Bridge DXE SMM initialization is started
72h	South Bridge devices initialization
73h – 77h	South Bridge DXE Initialization (South Bridge module specific)
78h	ACPI module initialization
79h	CSM initialization
7Ah – 7Fh	Reserved for future AMI DXE codes
80h – 8Fh	OEM DXE initialization codes
90h	Boot Device Selection (BDS) phase
91h	Driver connecting is started
92h	PCI Bus initialization is started
93h	PCI Bus Hot Plug Controller Initialization
94h	PCI Bus Enumeration
95h	PCI Bus Request Resources
96h	PCI Bus Assign Resources
97h	Console Output devices connect
98h	Console Input devices connect
99h	Super IO Initialization
9Ah	USB initialization is started
9Bh	USB Reset
9Ch	USB Detect
9Dh	USB Enable
9Eh – 9Fh	Reserved for future AMI codes
A0h	IDE initialization is started
A1h	IDE Reset
A2h	IDE Detect
A3h	IDE Enable
A4h	SCSI initialization is started
A5h	SCSI Reset
A6h	SCSI Detect
A7h	SCSI Enable
A8h	Setup Verifying Password
A9h	Start of Setup
AAh	Reserved for ASL (see ASL Status Codes section below)
ABh	Setup Input Wait
ACh	Reserved for ASL (see ASL Status Codes section below)
ADh	Ready To Boot event
AEh	Legacy Boot event
AFh	Exit Boot Services event
B0h	Runtime Set Virtual Address MAP Begin
B1h	Runtime Set Virtual Address MAP End
B2h	Legacy Option ROM Initialization
B3h	System Reset
B4h	USB hot plug
B5h	PCI bus hot plug
B6h	Clean-up of NVRAM
B7h	Configuration Reset (reset of NVRAM settings)
B8h - BFh	Reserved for future AMI codes
C0h - CFh	OEM BDS initialization codes

Table 6.4. POST Codes ***< 3 / 3 >***

POST (hex)	Description
ACPI/ASL Checkpoints	
01h	System is entering S1 sleep state
02h	System is entering S2 sleep state
03h	System is entering S3 sleep state
04h	System is entering S4 sleep state
05h	System is entering S5 sleep state
10h	System is waking up from the S1 sleep state
20h	System is waking up from the S2 sleep state
30h	System is waking up from the S3 sleep state
40h	System is waking up from the S4 sleep state
ACh	System has transitioned into ACPI mode. Interrupt controller is in PIC mode.
AAh	System has transitioned into ACPI mode. Interrupt controller is in APIC mode.

SERIAL I/O Address and Register Function

The following table lists the I/O addresses in case of SERIAL A.

Table 6.5. I/O Address

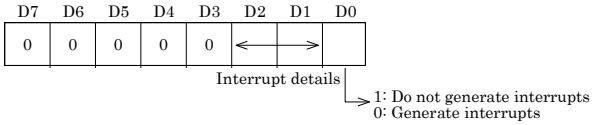
I/O address	DLAB	Read/Write	Register	
03F8H	0	W	Transmitter holding register	THR
		R	Receive buffer register	RBR
	1	W	Divisor latch register (LSB)	DLL
03F9H	1	W	Divisor latch register (MSB)	DLM
	0	W	Interrupt enable register	IER
03FAH	X	R	Interrupt ID register	IIR
03FBH	X	W	Line control register	LCR
03FCH	X	W	Modem control register	MCR
03FDH	X	R	Line status register	LSR
03FEH	X	R	Modem status register	MSR
03FFH	X	R/W	Scratch register	SCR

DLAB (Divisor Latch Access Bit) : The value in bit 7 of the line control register.

Table 6.6. Function of Each Register ***< 1 / 4 >***

I/O address	Description
03F8H	THR: Transmitter Holding Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to write transmitted data to
03F8H	RBR: Reciever Buffer Register [DLAB=O] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Register dedicated to read received data from
03F8H	DLL: Divisor Latch (LSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (LSB)
03F9H	DLH: Divisor Latch (MSB) [DLAB=1] D7 D6 D5 D4 D3 D2 D1 D0 bit7 MSB ← → bit0 LSB Baud rate setting register (MSB)
03F9H	IER: Interrupt Enable Register [DLAB=0] D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 0 EMS ELSI ETHREI ERDAI ERDAI: Received data Interrupt enable ETHREI: Received data register empty Interrupt enable ELSI: Receiver line status Interrupt enable EMS: Modem status interrupt enable [Always used at 0.] 1: Enable interrupt 0: Disable interrupt

Table 6.6. Function of Each Register ***< 2 / 4 >***

<table>
<tr><th>I/O address</th><th>Description</th></tr>
<tr><td>03FAH</td><td>IIR : Interrupt Identification Register


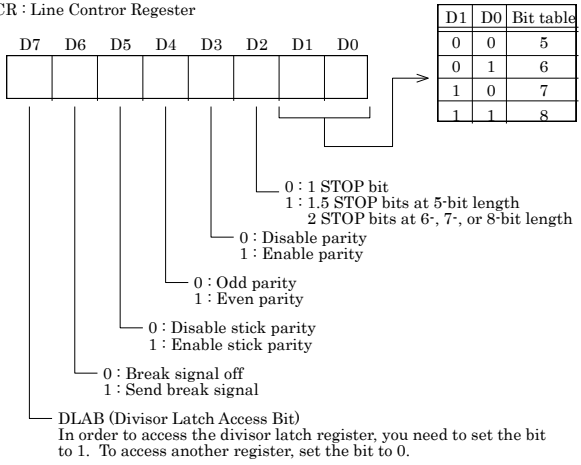
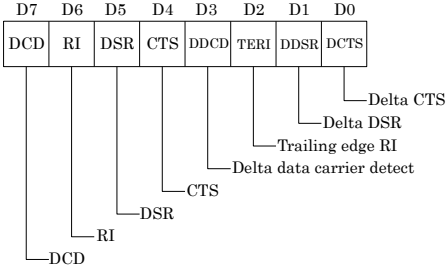
<table>
<tr><th>bit2</th><th>bit1</th><th>bit0</th><th>Priority</th><th>Description</th></tr>
<tr><td>0</td><td>0</td><td>1</td><td>——</td><td>Interrupts are not generated.</td></tr>
<tr><td>1</td><td>1</td><td>0</td><td>1 (high)</td><td>Generated by overrun, parity, framing error or break interrupt.
Cleared when the line status register is read.</td></tr>
<tr><td>1</td><td>0</td><td>0</td><td>2</td><td>Generated when the receive buffer register is ready.
Cleared when the receiving buffer is read.</td></tr>
<tr><td>0</td><td>1</td><td>0</td><td>3</td><td>Generated when the transmitter holding register is empty. Cleared when the IIR is read or when transmitted data is written to THR.</td></tr>
<tr><td>0</td><td>0</td><td>0</td><td>4 (low)</td><td>Modem status interrupt is generated.
(CTS, DSR, RI, CD)
Cleared when the modem status register is read.</td></tr>
</table></td></tr>
<tr><td>03FBH</td><td>LCR : Line Contror Regester

</td></tr>
</table>

Table 6.6. Function of Each Register ***< 3 / 4 >***

I/O address	Description
03FCH	MCR: Modem Control Register D7 D6 D5 D4 D3 D2 D1 D0 0 0 0 Loop IRQ X RTS DTR DTR 0 : Inactive [HIGH] 1 : Active [LOW] RTS 0 : Inactive [HIGH] 1 : Active [LOW] Interrupt control bit 0 : Disable 1 : Enable Diagnostic local loop-back test 0 : Disable 1 : Enable
03FDH	LSR: Line Status Regester D7 D6 D5 D4 D3 D2 D1 D0 0 TEMT THRE BI FE PE OE DR Data ready (1 for existence of received data) Overrun error (1 for occurrence of an error) Parity error (1 for occurrence of an error) Framing error (1 for occurrence of an error) Break interrupt (1 for detection of break state) Transmitter holding register empty (1 for transmission buffer being empty) Transmitter empty (Set to 1 when both transmitter holding register and transmitter shift register are empty.)

Table 6.6. Function of Each Register ***< 4 / 4 >***

I/O address	Description
03FEH	MSR : Modem Status Register 
03FFH	SCR : Scratchpad Register This is an 8-bit, readable/writable register which is available to the user to allow data to be saved temporarily.

Baud Rate Settings

A baud rate is set by software by dividing the clock input (1.8432MHz). The baud rate in terms of hardware can be set to a maximum of 115,200 bps for SERIAL A, B, C, D. The baud rates available in practice depend on the operating environment (cable, software, etc.). The table below lists typical baud rates and their respective values to be written to the divisor latch register (LSB, MSB).

Table 6.7. Baud Rate Settings

Baud rate to be set	SERIAL A, B, C, D Clock input (1.8432MHz)	
	Value to be set in the divisor register (Decimal)	Setting error (%)
50	2304	---
75	1536	---
110	1047	0.026
134.5	857	0.058
150	768	---
300	384	---
600	192	---
1200	96	---
1800	64	---
2000	58	0.69
2400	48	---
3600	32	---
4800	24	---
7200	16	---
9600	12	---
14400	8	---
19200	6	---
28800	4	---
38400	3	---
57600	2	---
76800	---	---
115200	1	---
153600	---	---
230400	---	---

Example: To set 9,600 bps, write "00" to the (MSB) divisor latch register and "12 (decimal)" to the (LSB) divisor latch register.

Watch-Dog-Timer

The watchdog timer serves as a safeguard against possible system lock-up in your industrial computer system. In most industrial environments, there are heavy equipment, generators, high-voltage power lines, or power drops that have adverse effects on your computer system. For instance, when a power drop occurs, it could cause the CPU to come to a halt state or enter into an infinite loop, resulting in a system lock-up.

The application software created by user with the watchdog timer enabled, a RESET automatically generated unless the software periodically triggers the timer within the setting time-out interval. That is, while the system gets hung up, the running program can't trigger the timer periodically. The timer will generate a reset signal to reboot the system.

This feature allows a running program to restart in an orderly way when a power glitch or any abnormal condition occurs.

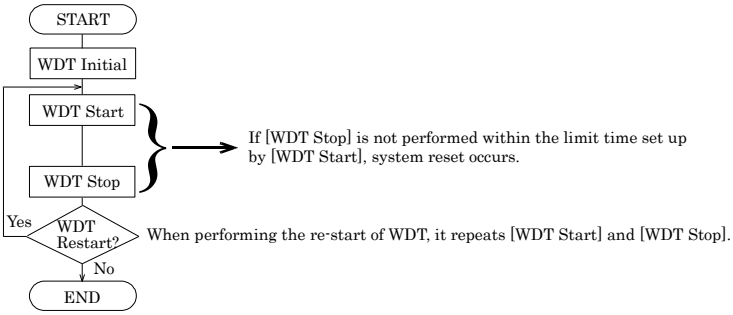
The watchdog timer comes with 255-level time-out interval, 1 - 255 seconds per interval, which can be adjusted by software setting. There is a tolerance of 2 second for this time-out interval. To maintain the normal system operation, trigger the timer periodically by the user-created program in consideration of the tolerance.

Ex.) If the time-out interval is set to 30 seconds, the user-created program must retrigger the watchdog timer before 28 seconds will have elapsed in consideration of the tolerance. If the program failed to retrigger the timer (if 28 - 32 seconds have elapsed), the system will automatically reboot.

The I/O port is defined at address 2e/2fH. You can trigger/enable disable the timer by writing address 2e/2fH.

Here is an example for flow chart and programming how to use the watch-dog-timer.

(1) Example flow chart


START
WDT Initial
WDT Start
WDT Stop
If [WDT Stop] is not performed within the limit time set up by [WDT Start], system reset occurs.
Yes
WDT Restart?
When performing the re-start of WDT, it repeats [WDT Start] and [WDT Stop].
No
END

* It is also possible not to perform [WDT Stop] instead of performing [WDT Stop] to [WDT Start], but to perform [WDT Start] continuously at the time of a re-start.

(2) Example programming

The following example is written in Intel8086 assembly language.

```
;===============
;<WDT Initial>
;===============
;-----------------------------------------
;Enter the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-------------------------------------
;Set WDT function at pin89
;-------------------------------------
MOV DX,2EH
MOV AL,2BH
OUT DX,AL
MOV DX,2FH
MOV AL,0DH
OUT DX,AL
;-------------------------------------------------
;Select logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;-------------------------------------------------------
;Activate logical device WDT(number 8)
;-------------------------------------------------------
MOV DX,2EH
MOV AL,30H
OUT DX,AL
MOV DX,2FH
MOV AL,01H
OUT DX,AL
;-------------------------------------
;Set timer unit : second
;-------------------------------------
MOV DX,2EH
MOV AL,F5H
OUT DX,AL
MOV DX,2FH
```

```
MOV AL,00H
OUT DX,AL
;-----------------------------------------
;Exit the extended function mode
;-----------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL

;================================
;<WDT START : counter set and a start >
;================================
;-----------------------------------------------
;Enter the extended function mode
;-----------------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;-------------------------------------------------
;Select logical device WDT(number 8)
;-------------------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;---------------------------------------------------------
;Set time of WDT and start to count down
;---------------------------------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;-------------------------------------------------------------------------------------
;The data of an example is 15 seconds.(01H=1sec.- FFH=255sec.)
MOV AL,0FH      ; 0FH = 15Sec.
;-------------------------------------------------------------------------------------
OUT DX,AL
;-----------------------------------
;Exit the extended function mode
;-----------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

```
;==============
;<WDT STOP>
;==============
;------------------------------------
;Enter the extended function mode
;------------------------------------
MOV DX,2EH
MOV AL,87H
OUT DX,AL
OUT DX,AL
;------------------------------------
;Select logical device WDT(number 8)
;------------------------------------
MOV DX,2EH
MOV AL,07H
OUT DX,AL
MOV DX,2FH
MOV AL,08H
OUT DX,AL
;------------------------------------
;Stop count down of WDT
;------------------------------------
MOV DX,2EH
MOV AL,F6H
OUT DX,AL
MOV DX,2FH
;------------------------------------
;The data of 00H is stop WDT
MOV AL,00H
;------------------------------------
OUT DX,AL
;------------------------------------
;Exit the extended function mode
;------------------------------------
MOV DX,2EH
MOV AL,AAH
OUT DX,AL
```

⚠ CAUTION

The timer's intervals have a tolerance of ±2 seconds.

Status LED

The operation of the status LED can be controlled from user applications.

The following is a sample program created in an MS-DOS environment with MSC version 8.03.

The status LED blinks once per second for approximately 10 seconds.

```
#include <stdio.h>
#include <time.h>
#include <dos.h>
#include <io.h>

#define  IDX                    0x2e
#define  DAT                    IDX+1
#define  IOWAIT     outp( 0xed, 0x00 )


/* READ WD83627 CR */
int      get_reg( int adr )
{
         IOWAIT;
         outp( IDX, adr );
         IOWAIT;
         return inp( DAT );
}

/* WRITE WD83627 CR */
void set_reg( int adr, int dat )
{
         IOWAIT;
         outp( IDX, adr );
         IOWAIT;
         outp( DAT, dat );
}

/* WD83627 SET LOGICAL DEV */
void set_ldev( int dev )
{
         set_reg( 7, dev );
}

/* OPEN WD83627 CR */
void open_dev( void )
{
         IOWAIT;
         outp( IDX, 0x87 );
         IOWAIT;
```

```
        outp( IDX, 0x87 );
}

/* CLOSE WD83627 CR */
void close_dev( void )
{
        IOWAIT;
        outp( IDX, 0xaa );
}

int     main( int argc, char *argv[] )
{
        time_t      otm,rtm, rtm2;

        open_dev();

        set_ldev( 9 );
        set_reg( 0x30, get_reg(0x30) | 0x08 );  // Enable GPIO5x
        set_reg( 0xe0, get_reg(0xe0) & 0xdf ); // GPIO55(SLED) output
        set_reg( 0xe1, get_reg(0xe1) & 0xdf ); // GPIO55(SLED) OFF

        otm=rtm=rtm2=time(&rtm);

        while( (otm+10)>rtm ){
                rtm=time(&rtm);
                if( rtm != rtm2 ){
                        rtm2 = rtm;
                        if( rtm%2 ){
                        set_reg( 0xe1, get_reg(0xe1) | 0x20 );   // GPIO55(SLED) ON
                        }
                        else{
                        set_reg( 0xe1, get_reg(0xe1) & 0xdf ); // GPIO55(SLED) OFF
                        }
                }
        }

        close_dev();

}
```

Battery

Battery Specification

This product uses the following battery.

- Type : Lithium primary battery
- Model : BR-1/2AA
- Maker : Panasonic
- Nominal voltage : 3V
- Nominal capacity : 1000mAh
- Lithium content : 1g or less

Removing the battery

Remove the battery according to the following figure.

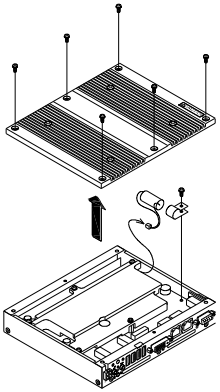


Figure 6.1 Removing the battery

Disposing the battery

Dispose the removed battery properly as instructed by local government.

Difference Between BX-955 and BX-955S

There is the following difference between the BX-955S and the conventional BX-955.

	BX-955	BX-955S
CPU	Intel(R) Atom™ Processor N270 1.60GHz (FSB533MHz)	Intel(R) Atom™ Processor N2600 (1.6GHz)
Chipset	Intel(R) 945GSE + ICH7M-DH	Intel(R) NM10
Interface	CF card	CFast card
Power consumption	12V 3.3A (Max.), 24V 1.7A (Max.) (IPC-BX955D-DCxxx) 12V 3.7A (Max.), 24V 2.0A (Max.) (IPC-BX955DR-DC556)	12V 2.5A (Max.), 24V 1.4A (Max.)
Weight	About 1.4kg	About 1.3kg

7. List of Options

AC adapter

-	IPC-ACAP12-04A	AC adapter (Input: 100-240VAC, Output: 12VDC 4A)

CFast card

-	CFS-4GB-A	CFast card 4GB
-	CFS-8GB-A	CFast card 8GB

Bracket

-	BX-BKT-VESA02	Bracket for VESA (“75 x 75” - “100 x 100”)

* For more information on this options, see the Contec’s website.

BX-955S Series

User's Manual

BX-955Sx-DC6xxx

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